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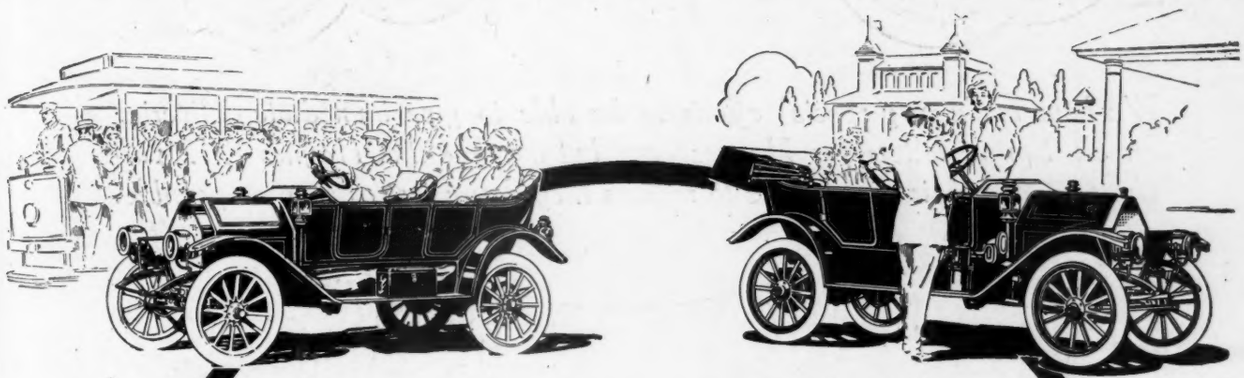
MOTOR AGE

VOLUME XXI CHICAGO, MARCH 28, 1912 NUMBER 13



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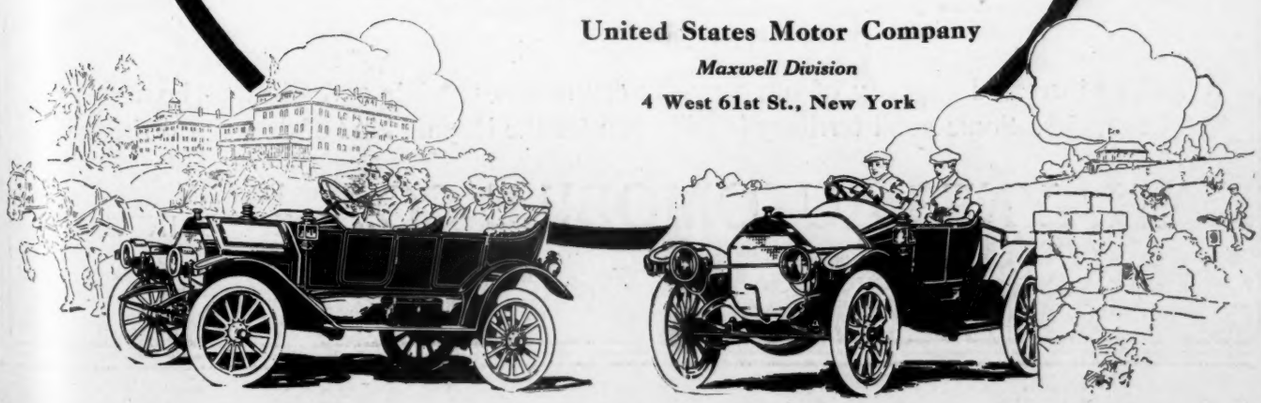
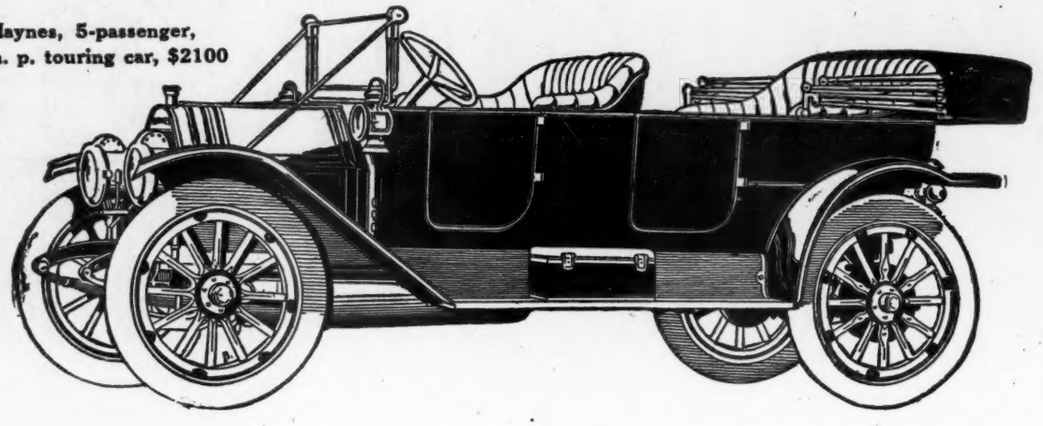


Haynes, 5-passenger,
40 h. p. touring car, $2100



We have made very special efforts to be able to give immediate deliveries on all Spring orders for Haynes cars, but we urge that Haynes 1912 purchasers make their decisions as to models they desire just as soon as possible.

The HAYNES Car

Product of Eighteen Years of Automobile Building

has made even greater appeal to motor car purchasers this year than ever before. The reasons are obvious. The Haynes—a sturdy, powerful, dependable car for *years*—is *larger* and *more powerful,* and to its *mechanical* excellence we have added the utmost in grace of design and beauty of finish.

A host of Haynes owners agree with us that the Haynes represents maximum motor car efficiency at the minimum cost.

Model 21, 5-passenger touring car, is shown in the illustration. A handsome, roomy car, 40 h. p., 4½x5½ inch motor, 120 inch wheel base, 36x4 inch tires, demountable rims. Price, $2100. Other body types: 4-passenger Suburban, $2100; Colonial Coupe, $2450; Newport Limousine, $2750.

Equipment includes Eisemann dual magneto, Stromberg Model B carburetor, Warner 60-mile speedometer, silk mohair top, automatic and ventilating windshield, Prest-O-Lite tank, 5 lamps, extra Dorian demountable rim, gasoline gauge.

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The increased capacity of our new factory makes possible several new Haynes agencies. Some good territory is still open for the Haynes kind of dealers. Write

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VOL. XXI, No. 13 CHICAGO, MARCH 28, 1912 $3.00 PER YEAR

MOTOR AGE

Trail-Blazing Through Mexican Wilds

Adventures of Pacific Highway Association Pathfinder

A MEXICAN BOULEVARD BETWEEN CULIACAN AND MAZATLAN

By T. J. Beaudet

FOR the first time in my life I can realize how Balboa must have felt when he reached the summit of the mountains which make the Pacific coast a little world of its own and beheld far in the distance of the waters of the mighty Pacific.

I now can understand the thrill of Columbus when that cry of "Land, land, land" rang out on his vessel so many years ago.

For almost 2 months I have been battling through a country where the motor car was unknown. For days and days I sat at the wheel of my Cadillac and fought my way through a land which from all appearances had never been touched by a white man before.

To me came the honor of driving the first motor car down the west coast of Mexico, from Los Angeles to the capital of the sister republic. And when I felt the wheels of my motor car roll onto the boulevard which was to lead me into the heart of that Mexican city I knew the feeling of victory of the early explorer

Editor's Note—The most adventuresome pathfinding trip of recent years was that made by Mr. Beaudet, who blazed the trail from Los Angeles to the City of Mexico for the Pacific Highway Association. He encountered difficulties far out of the ordinary and his progress was watched with interest by motorists in all parts of the country.

who realized the completion of an hitherto considered impossible task.

When the trip was completed the car had traveled 3,347 miles. The exact mileage from Los Angeles to the City of Mexico I should judge is about 3,100 miles. We were forced to go many miles out of our way and if a direct route were built the distance could be cut down to about 2,700 miles.

When the bells were ringing in the New Year at 1 minute after midnight the Cadillac started on its long journey. Early New Year's morning we arrived in San Diego and were greeted by the mayor and city officials. Our stop was brief and we continued on, not stopping for rest until over 300 miles had been covered. Our fight over the California and Arizona desert took us to Phoenix and after a brief stop there we traveled south to Tucson.

Crossing the Border

We were up and away early, and drove the car over a very sandy floor to Nogales. At Nogales it seemed it would be necessary to turn back. There were wild rumors flying about concerning the situation in Mexico, and many people tried to make us desist from our purpose. After 3 days, against the advise of everybody, we decided to cross the border, and just at dawn we found ourselves in the land of the Aztecs. By the evening of the same day we were rolling peacefully into Hermosillo. Here, where wild reports had informed us that a hostile populace would bar our progress, we were received with the greatest kindness and consideration. There was not a native in the town who did not try to speed us on our way. We were comfortably lodged, well fed, and sent out on the road to the capital of the country cheered by the citizens.

From Hermosillo to Empalme, in the state of Sonora, is 30 miles, and the road is most difficult. We made, by the odometer, a distance of 93 miles that day to wend our way into Empalme.

A SAMPLE OF ARIZONA SAND — NOTE FLANGED HUB, USED AS WINDLASS

We had to hire an Indian to direct us out of the village and from there on plunged down into the Yaqui valley. The most alarming reports about conditions were still the rule. And the Yaqui valley was not exactly at peace. There were possibly 3,000 federal soldiers on our right and the Lord only knows how many in the hills on our left. But we won our way through without hurt.

Marooned in Midstream

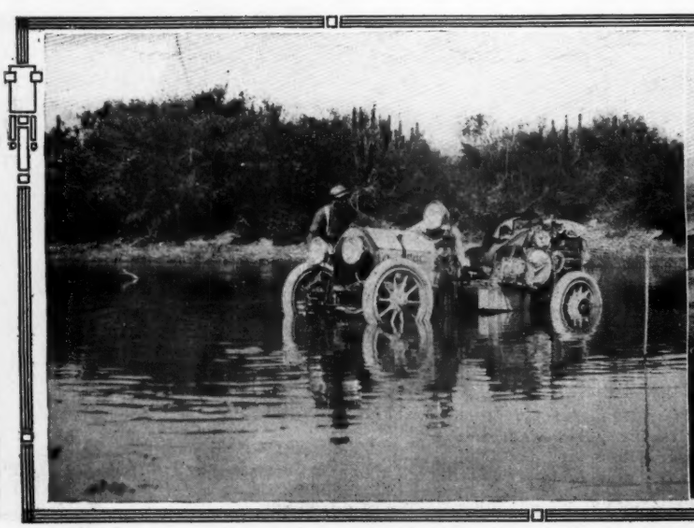
Then came the most irritating part of the journey. At Navajoe, in trying to cross a stream we were marooned in the center of the watercourse and all of our ingenuity could not move us; so we were compelled to spend the night in the car in midstream, with the lapping of water surging around the stripped car and a thousand unknown dangers lurking on the barely perceptible shore. We ran into the nearest town the next morning, and I removed 4 gallons of water from the engine.

It took us 5 days of the hardest driving I have ever known, and I am accustomed to easy work, to go from Culiacan to Mazatlan. The distance by motor is approximately 200 miles. The road was completely washed out at times, and when we casually inquired from a native when any vehicle had tried to negotiate it in the past, he said that in 3 years past not even a wagon has essayed it. It was horrible. There was a tradition that some time in the remote past a Spanish road had existed, but nothing but a burro had traversed it for years. We rested at Mazatlan, the town which nearest approached civilization since leaving Hermosillo.

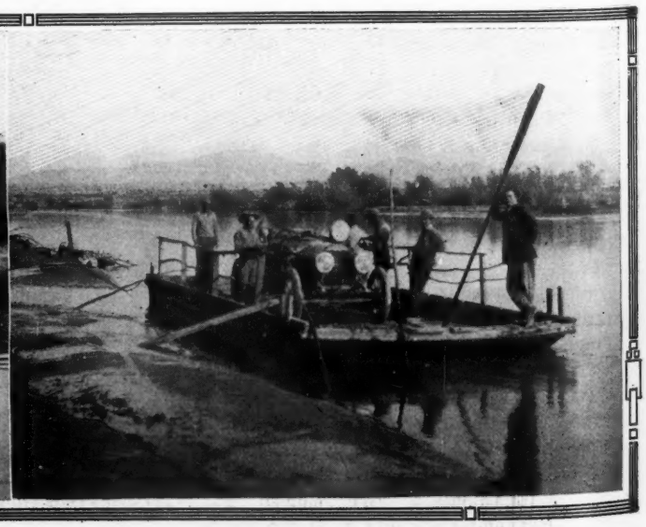
Mazatlan Road Unspeakable

The road from Mazatlan is unspeakable. An aeroplane or a bird is the only thing which can successfully cross it, without great labor. Ten miles out on our way to Acaponeta we were mired in quicksand, and it required the services of fourteen natives to build a corduroy road so that we might reach something like solid land. This consumed 2 days, and when it was over we all had a touch of the fever and rest was necessary. Then, on top of all these troubles, the heavens opened and it rained incessantly for 5 days. There is a decent inn at Acaponeta and we took advantage of this until the downpour ceased.

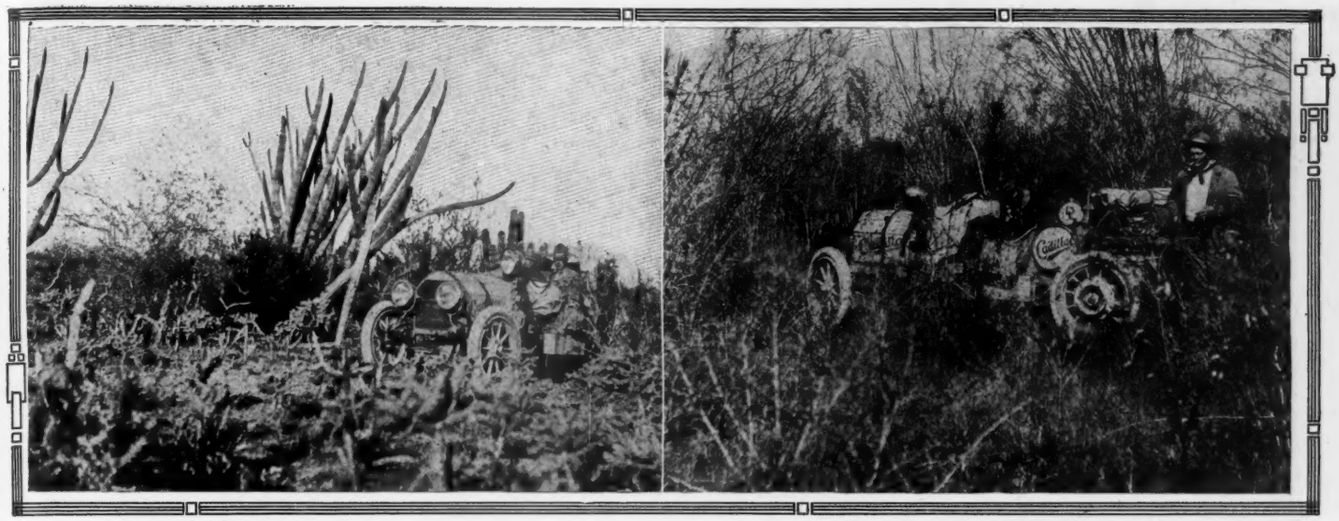
Rested, we felt equal to anything, and started out toward our next objective, Rosa Morado, over muddy roads, with stout hearts, and at this latter town we inspected the old Spanish city, now a dismal ruin in that vicinity. It was said that it used to be a great mining camp in the days of the conquistadores; it is now a crumbling, half-buried ruin. Evidence of its former importance still remains in the weather-eaten pillars, the foundation of what must have been great storehouses, and the faint traces of broad roadways. Now it is but an echo of what it must have been when it was alive with life and action, and the Spaniard drove his way into the earth in search of its treasures.



FORDING RIVER NEAR TEPIC



CROSSING A MEXICAN RIVER



GIANTS OF SONORA DESERT

A TRULY MEXICAN WILDERNESS

After a short rest here we started for Tepic. Here is where the west coast fever attacked me. I almost fainted at the wheel, and Chester Lawrence, my companion, supported me into the city. Another stop was necessary so that I might regain sufficient strength to drive the car. And here the greatest of all disappointments awaited me. A telegram from Los Angeles recalled Lawrence to Los Angeles, and I was calculating on a lonesome journey to the capital when I fortunately fell in with E. L. Holmdahl, a good scout, a soldier, and above all a mechanician of ability. Holmdahl has been a staff in the desert, a steel rod on which to lean, a companion without whom I possibly would have given up in despair and returned to California. Well, however, Holmdahl joined his fortunes with mine.

Sierra's Terrific Roads

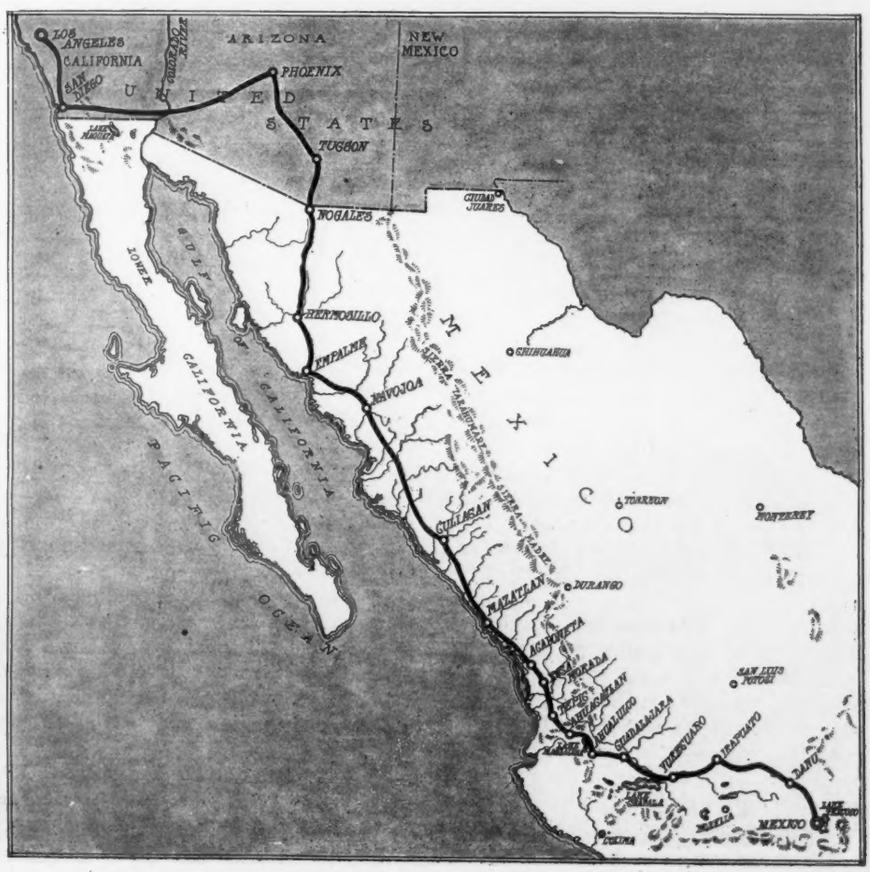
With my new companion I left Tepic for San Marcos. There are no adequate adjectives in the English language to describe the terrific roads over the sierra from the city of Tepic to San Marcos. There may be worse roads somewhere in the world, but I must see them to believe it. It was unbroken country. Half of the time we were out of car assisting the car itself over grades unthought of, through gullies half-filled with water from the constant rains, or skidding around precipices and plunging down hills no man-made machine had ever attempted. It was simply awful. But still the motor car went on. The tires were ripped to pieces. When we dragged ourselves into Ahululco it is a question whether the man at the wheel or the engine was most in need of rest. I know my engine was and I know that I was also. I looked upon the engine with a sympathetic commisseration and felt extremely sorry for myself.

From this pretty pueblo we sailed forth in search of new adventures in the direction of Guadalajara. We reached that thrice Heaven-blessed city at 11 o'clock in the morning, where a most enthusiastic bunch of motorists met and entertained us. Never shall I forget Guadalajara. It was a great green oasis in a desert of rock and sand. We stayed at Guadalajara all day and left in the morning.

Under the circumstnces our run to the next town, Yurecuaro, was pleasant, and we stopped all night at this village. The next day we were on the road again with Irapuato as our objective point. Here is where we met with the first discourtesy shown us since we entered Mexican territory. In passing through the hamlet of Chintepec, we happened up on some sort of a fiesta where there were many who had indulged not wisely but too well, and they stoned us, or least a number of them threw rocks in our direction, and while no one was injured, we rather thought it was our move, so, with every ounce of power the machine was capable of, we left that town speedily behind us.

Held Up as Suspects

Irapuato was the resting place the next night. From here we were destined to encounter more hard luck. The road dis-



ROUTE FROM LOS ANGELES TO CITY OF MEXICO FOLLOWED BY BEAUDET

CONTESTANTS IN TOUR OF FRANCE ENCOUNTER FINE EXAMPLES OF ROAD BUILDING

appeared, and we had to stop and construct a bridge of a rude kind over a railway fill before we rolled into Danu.

After Danu the road was easy to Atzcapotzalco, and had it not been for a blundering official there, who mistook us for suspicious characters, all would have gone well. Within sight of the towers of the capital we were for a short time detained as suspects, but were released as soon as we could wire to our friends in Mexico City and the Daily Mexican. And when we arose next morning and trimmed up as best we might our car for its entrance into the city, we were the most gratified men on earth to see the waving banners of the cars coming to meet us.

It was simply a battery of lenses from Atzcapotzalco into the very heart of the city, and then it was worse afterwards—everyone wanted to take our pictures.

Equipment of Expedition

Loaded for action, the Cadillac which I have had the honor to drive from the Pacific coast to within the shadow of Chapultepec, weighs 4,700 pounds. It averaged 10 miles to 1 gallon of gasoline. Our carrying capacity was 42 gallons of gasoline and 12 gallons of lubricating oil.

I have nothing but praise for the treatment I received on my journey through the republic. I was received with much more courtesy, I was shown much more consideration, I was accommodated at every point in much greater measure than in the United States. When I left Nogales and crossed into Mexican soil there were many stories rife about how an American would be treated once he crossed the border.

Glad He Made Trip

I am delighted that I was able to make the trip. While it entailed considerable hardship, and I contracted a slight fever because of the difference in climate on the tropical west coast, I would do it all over again in a cause, which means so much to commerce, progress, and the uniting of the sister republic.

The Pacific Highway Association 8 months ago put up a medal as a prize for the man who could break a motor trail from Los Angeles by way of San Diego, crossing the Mexican border at one point down the west coast of the City of Mexico. No one seemed to care to take the matter in hand, so I undertook to do it and I met with success.

I have broken a trail. There is no road. There are here and there down the Pacific coast of Mexico and on into its interior quaint and faint remains of old Spanish thoroughfares, but nothing resembling what is modernly known as a road. And it is a pity. I have never in my life's long journeying, principally in motor cars, ever seen a country so rich in all that nature could endow here with and so poorly treated in the matter of thoroughfares. It would cost but little money comparatively to construct a road from Nogales to Mexico City. There are difficulties, certainly, but these are by no means insurmountable. The money expended in this way would bring back to the nation a hundred fold of the expenditure within 10 years time. The Pacific Highway Association is not a road-building concern. It is a road-promoting society, and as such is entitled to great consideration.

Country Awaiting Development

No one can conceive, unless he has personally inspected the country on the west coast, what vast wealth lies there, simply awaiting a chance of development and an opportunity to market that wealth after development.

Transportation is the key to the subject and good roads are the first step toward transportation, the thing that welds the world together and is the greatest civilizing influence on God's footstool. Give us good roads and I will show you the universal brotherhood of the North and South American continents.

French Tour Develops into a Big Row

Disqualification of Ford Cars Brought About by Changing to Smaller Wheels for Hill-Climbing Purposes —Benz Sportmanship Questioned

PARIS, March 12—War has been declared between the French agent for the Ford company and the organizers of the tour of France endurance competition. Henry Depasse entered a team of three Ford cars for the 3,000-mile run around France, and in place of the standard wood wheels equipped them with a set of detachable wire wheels. This change also was made to the two Reo cars entered in the competition.

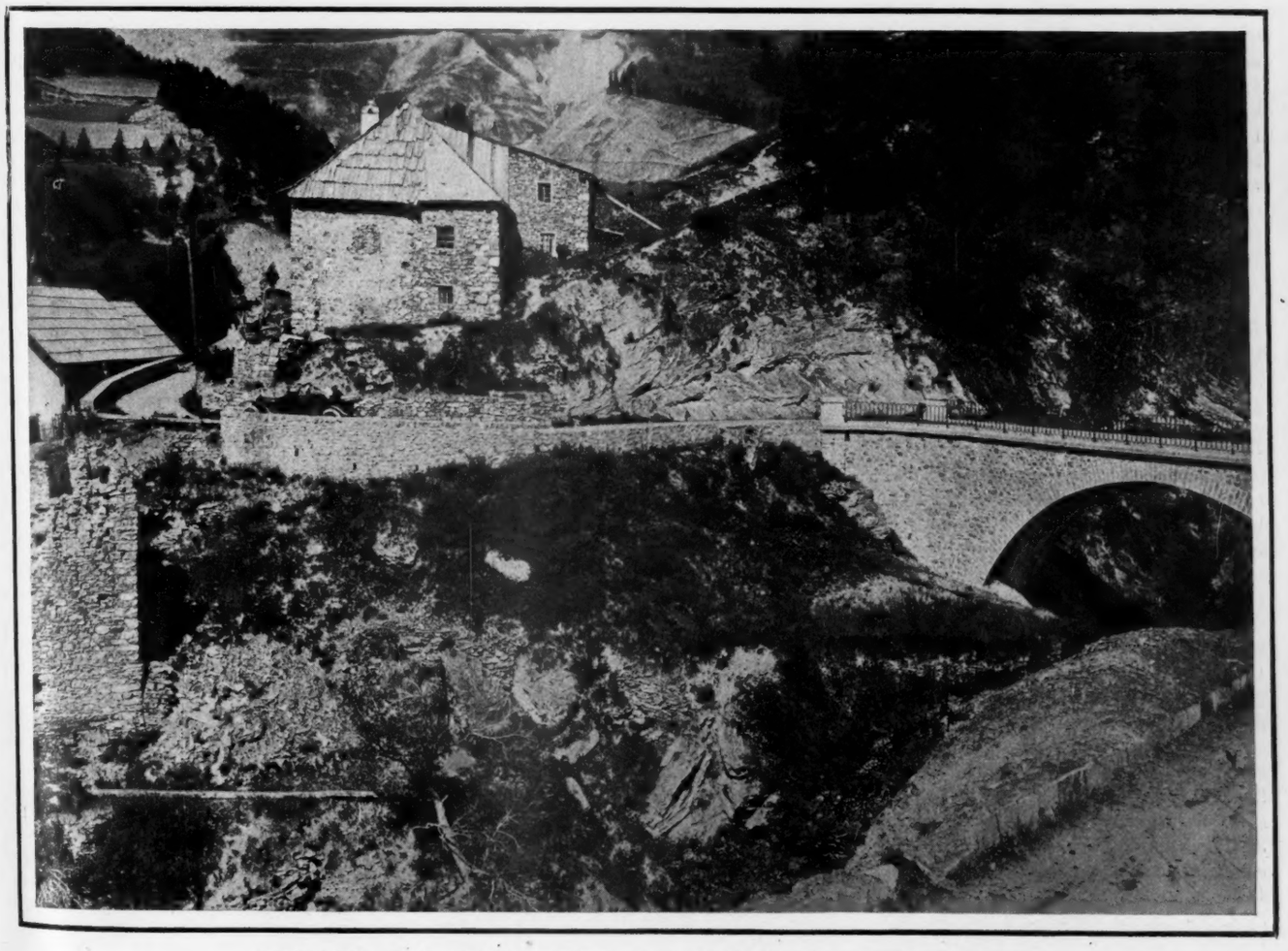
At the commencement of the mountainous stage of the journey, from Grenoble to Nice, the Ford cars had their rear wheels replaced by others of smaller diameter, to get advantage of a lower gear ratio. There is nothing in the rules governing this point, and the contention of Depasse was that anything which was not forbidden was allowed. The other competitors, however, did not see it in the same light, with the result that protests flowed in and the jury finally disqualified the entire Ford team.

Instead of retiring, Henry Depasse contested the right of the jury to disqualify him, ordered his three cars to continue to follow the route unofficially, and at the same time undertook a publicity campaign against the organizers, in which he accused them of having ruled him out because they were afraid of him.

In this connection it is worth noting that the Ford is one of the few teams having covered two-thirds of the course without the loss of a single point. This brought forth a further protest on the part of the other competitors, who declared that the decision of the jury was an equitable one and that the publicity of the Ford agent was an attack on the honor of both the competitors and the jury. The Ford is now outlawed, but Henry Depasse declares that it is his intention to bring the matter before the civil court immediately on returning to Paris.

In technical circles the tour of France is looked upon as nothing more than a huge joy ride. The only stipulation is that the competitors shall maintain an average speed of about 18¾ miles an hour over daily runs varying from 200 to 230 miles. Most of the light cars are capable of much higher speeds, and for the first few days a series of races were indulged in, in which the six-cylinder Delage, the two Scar cars and the Benz team figured prominently. It was only by changing the order of starting every day and refusing to give out any times that the racing practice could be abolished.

A flagrant violation of the spirit of the competition is shown by the Benz team. The three competing cars are accompanied by a 40-horsepower model carrying spare tires, wheels, gasoline, oil, tools, a couple of mechanics, and everything necessary for making good a most serious breakdown. As the cars travel together, there are eight skilled men available in case of any difficulty, and as many tools as can be found in the average workshop. The other competitors have protested, but as this practice is not forbidden in the rules, they are powerless to interfere, so the Benz team continues the tour.



SCENIC BEAUTIES OF THE FRENCH TOUR—PICTURESQUE BRIDGE NEAR NICE

Willys Buys into the Gramm Company

Maker of the Overland Now Has Controlling Interest in Motor Truck Concern at Lima, O.—Price Not Announced But Said to Be $500,000—Definite Plans Not Given Out—Other Important Trade News

TOLEDO, O., March 26—John N. Willys, president and sole owner of the Willys-Overland plants, now is the controlling power in the Gramm Motor Truck Co., of Lima, O., having purchased the majority of stock. While no price is given, still it is stated on good authority that Mr. Willys paid $500,000 for the controlling interest. His engineers even now are at the Gramm plant and while no announcement has been made of the new policy, still it is stated that within a short time a positive statement will be issued.

As to what effect the deal will have on the Garford truck interests has not been stated, either. The Overland people have had the Garford for some time, but so far it has not been stated what will be done with it now that the new deal has been put through. It is said that in all probability Mr. Gramm will continue to be identified with the Gramm company, probably as consulting engineer. The Gramm truck agencies will be offered to dealers handling Overland pleasure cars and they will be given preference. In Chicago it is the intention of Charles W. Price, in control of the Overland business, to erect a new building in Michigan avenue between Twenty-fourth and Twenty-sixth streets, which will be large enough to care for the Gramm truck interests as well as the Overland business.

The Gramm plants at Lima are located on 22 acres of ground. There are 6¼ acres under roof. Twelve hundred men are employed. The buildings are of steel and reinforced concrete and are valued at $1,250,000.

INTERFERENCE CASE SETTLED

Washington, D. C., March 23—The court of appeals for the District of Columbia has handed down a decision in the interference declared by the patent office between the patent of Edward J. Gulick, then employed by the Simplex Motor Car Co. of Mishawaka, Ind., and Russell D. Huff of the Packard Motor Car Co. of Detroit, for a patent on rear axle construction, one of the points of which was a device to prevent leakage of oil from the axle to the rear wheel spokes. Gulick's claim, No. 904,774, was granted November 24, 1908, "for improvements in transmission gear casings for motor cars." Huff filed an application April 28, 1909, the serial number of the application being 492,665. His claims were so like Gulick's that the patent office declared an interference. The gist of the finding handed down by the court of appeals is that the decision of the commissioner of patents that the invention belonged to Gulick and not to Russell Huff. The Packard company claims it has not used this type of construction for some time and the value of the decision seems to be that the Amplex people to whom the Gulick patent was assigned would be protected in case a suit were started.

COLBY NOT IN MERGER

Mason City, Ia., March 25—Negotiations to bring about a merger of the Colby Motor Co. and the Western Implement and Motor Co. have come to naught, it being announced today by General Manager Murphy, of the Colby company, that the deal has been abandoned by mutual consent. There has been a reorganization of the Colby company, in which the Davenport concern does not figure at all, William M. Colby being re-elected president, James A. Colby vice-president and H. S. Murphy treasurer, secretary and general manager. A new board of directors also was chosen.

ZUST MATTERS CLEARING

New York, March 25—Composition of the debts of the Zust Motor Co. was made and accepted yesterday in the United States district court and the discharge of the company from bankruptcy is now only a matter of formal action. The adjudicated and proved up claims against the concern amounted to about $37,000 and under the terms of the composition, settlement will be made on a basis of 15 per cent. While nothing definite has been made in the way of an announcement as to future developments, it is understood that a reorganization is in prospect and that the Zust line will be handled in New York before the selling season has gone much further.

OHIO HAS CANADIAN PLANT

Cincinnati, O., March 23—By a deal just completed with the board of trade of Colborne, Ont., the Ohio Motor Car Co. of Cincinnati will locate its Canadian plant at Colborne, which is situated on Lake Ontario, 84 miles east of Toronto. A committee from the board of trade of Colborne visited the Ohio factory last week, at which time the deal for the building of the plant was completed. The Canadian company will be incorporated with $400,000 capital; $250,000 will be common stock and $150,000 preferred. While the Canadian company manufacturing the Ohio car will locate at Colborne, the general offices for the dominion of Canada, will be in Toronto. Charles F. Pratt, president and general anmager of the Ohio Motor Car Co. of Cincinnati, will continue as active head of the parent concern and will also have an active part in the management of the Canadian company. Work on the new factory will be started at once, the plans for the new building having already been approved.

LOCATED IN GRAND RAPIDS

Grand Rapids, Mich., March 25—The Grand Rapids Motor Truck Co. now is settled in its new plant. The following officers and directors have been chosen: President and general manager, M. E. Brackett; vice-president, E. A. Clements; secretary and treasurer, Frank T. Hulswit; directors, Carrol F. Sweet, E. A. Clements, H. L. Adzit, F. T. Hulswit, W. F. McKnight and John W. Blodgett, of Grand Rapids, and M. E. Brackett, of Decatur, Ind; W. J. Vesey, of Fort Wayne, Ind., and John L. Taylor, of Boston. To facilitate the organization of the company $100,000 worth of stock has been underwritten by Grand Rapids men. This is preferred stock and will be offered for sale at par.

MEXICAN BRANCH FOR GOODYEAR

Mexico City, Mexico, March 25—The Goodyear Tire and Rubber Co., of Akron, Ohio, is preparing to establish a branch establishment here. It has leased for a long term of years a three-story building at the corner of Avenida Juarez and Balderas, and the structure is being remodeled inside to meet the special requirements of the business. It is announced that a full line of the company's products will be carried. The officers of this Mexico branch will be: J. C. MacFadyean, formerly in charge of the company's branch in Indianapolis, director general; S. F. Fuller, formerly connected with the Mexican Clay Products Co., in this city, secretary and treasurer.

FIGHT OVER KRUPP NAME

New York, March 23—Thomas Prosser, of Thomas Prosser & Son, representing the Krupps of Germany, has instituted suit for an injunction in the United States district court at Wilmington, Del., against the Krupp Motors Co., of Pittsburgh, Pa., for alleged illegal use of the trademark "Krupp." The suit was filed in Wilmington because the Pittsburgh concern was chartered in Delaware, its capitalization being $250,000. The case is set for a hearing before Judge Bradford on April 17.

According to the bill filed, the defendant seeks "to deceive and mislead the public and purchasers and cause them to believe" that the Krupps of Germany made its products and has advertised the "Krupp automobile," "Krupp car" and "Krupp steel car." It is asserted this is in violation of the Krupp's exclusive

Motor Financial News from New York

right to the word "Krupp" as their trademark.

The German concern desires an injunction restraining the Pittsburgh company from using directly or indirectly the word "Krupp" or any word similar to it as part of its corporate name.

BILL OF INTEREST TO MAKERS

Washington, D. C., March 27—Special telegram—If the Campbell bill, H. R. 16844, is enacted by congress any manufacturer doing an interstate business stands in danger of going to prison unless he causes to be stenciled, printed or embossed upon every article manufactured by him, his name and address; if any other person, firm or corporation erases the manufacturer's name he, they or it may be subjected to penalty. It also is provided that anybody offering for sale or rent any property intended for interstate or foreign commerce shall furnish the name and address of the make of such property. The bill contains a clause providing for a fine of not more than $1,000 or imprisonment for more than 6 months or both.

STATUS OF NEW YORK SUITS

New York, March 26—Final hearing of the suit of the Republic Rubber Co. against Morgan & Wright has been advanced to the current calendar of the United States circuit court of appeals and may be called at any time. This case involves the validity and infringement of the Mell patent covering the staggard tread of the complaining company's line. In the United States district court the Republic contention was sustained and the present hearing is on appeal from that decision.

The Sager suit against Emil Grossman is on the equity calendar of the United States district court and probably will be reached Thursday.

CARHARTT RECEIVER DISCHARGED

New York, March 25—The affairs of the Carhartt Automobile Sales Co. have been finally settled by Judge Holt in the United States district court, who has signed an order discharging the receiver and cancelling his bond. All accounts of the defunct company have been settled.

AMENDING PATENT LAW

Washington, D. C., March 27—Special telegram—Representative Prouty of Iowa has introduced a bill to reform the scope and extent of patents. One amendment is directed to prevent patentees or licensees under patents from insisting by contract with distributors that a certain level of prices shall be maintained. Prouty states that his amendment will leave patentees the right to collect royalties, but will deprive them of the right to maintain monopolies to follow the goods after manufacture.

Earnings of United States Motor Co. for Last 6 Months of 1911 Announced at $10,332,087, Increase of 30 Per Cent

General Motors' Semi-Annnal Dividend Postponed a Month—Kelly-Springfield Report Out

NEW YORK, March 25—From the United States Motor Co. comes the news that the earnings of the holding concern and its subsidiaries for the 6 months ending January 31 amounted to $10,332,087 as against $7,813,816 for the corresponding period last year, which shows an increase of more than 30 per cent.

Going into details, it is shown that the sales reported by Maxwell, Columbia, Stoddard, Brush and Alden Sampson for the 6-month term in question, totaled $9,045,631 as against $6,730,707 a year ago. The Briscoe Mfg. Co., Providence Engineering Works, and the Gray Motor Co. had sales aggregating $1,286,456 as against $1,083,179. The holding corporation and its manufacturing branches earned $715,059, which would increase the grand total to $11,047,146.

President Briscoe is well satisfied with this showing, for he finds that in the past the profits in motor car manufacture are divided 33⅓ for the first 6 months and 66⅔ for the last 6 months. He declares there are orders on the books to keep the factories working to capacity for the next 90 days and that if the sales keep up as they have been going of late they will exceed the company's producing possibilities. So far in March, Mr. Briscoe says, the United Motors' business has been totaling about $100,000 a day.

From Boston comes news to the effect that a Boston syndicate headed by Bond & Goodwin has bought the Pope Mfg. Co.'s $1,000,000 2-year 6 per cent notes. It is said the bankers have disposed of the bulk of the new issue at par and interest. It is stated that these notes have been issued to take up the floating debt of about $250,000 and leave a substantial balance to increase the working capital in order to care for an increased output in 1913.

It is asserted that the Pope company has sold its entire 1912 output and now is at work on 1913. The fiscal year ends July 31 and the shipments to January were $350,000 in excess of the same 5 months last year.

It is announced that the semi-annual 3½ per cent preferred dividend of the General Motors Co., hitherto paid April 1, will come due a month later because on April 1 there will be due interest on the $15,000,000 issue of notes.

KELLY-SPRINGFIELD REPORT

New York, March 25—The Consolidated Rubber Tire Co., maker of the Kelly-Springfield tire, had net earnings of $114,020 for the year ending December 31, 1911, according to a report recently made. This was an increase of $28,505 over the previous year. The gross sales for 1911 were $3,383,532, as against $2,160,915 for 1910. The income account for the 2 years is shown by comparison as follows:

	1911	1910
Gross sales	$3,383,532	$2,160,915
Interest, divs. receivable	95,562	150,402
Total receipts	$3,479,094	$2,311,317
Expenses, taxes, etc.	3,365,074	2,225,802
Net earnings	$ 114,020	$ 85,515

GOODRICH DEAL GOES THROUGH

Akron, O., March 27—The plan to increase the capital stock of the B. F. Goodrich Co. to $45,000,000 went through at a meeting of stockholders here this afternoon. At the close of the meeting Secretary Raymond gave out this statement: "The plan to increase capital stock of the Goodrich company to $45,000,000 was adopted by all of the representation of the stock present. There was 98½ per cent of the common stock present and 95½ per cent present of the preferred. The vote was unanimous."

One of the stockholders said: "We will retire one-third of the preferred stock per year and will not pay more than 125 per cent when it is taken off the market."

NEW YORK RUBBER MARKET

New York, March 25—Covering by shorts in the London market for crude rubber was reflected on Monday in the New York trading and price levels were raised to new high marks. The closing figures were $1.23 to $1.24 a pound, based on fine up-river.

TAXICAB DEAL GOES THROUGH

New York, March 26—Stockholders of the New York Transportation Co. called to a special meeting Monday, ratified the proposal to sell the taxicabs, garage, machine shop and good will of the company to the Connecticut Taxicab Co., of New York. The exact terms of the sale were not announced.

TONE JOINS OVERLAND

Toledo, O., March 25—Fred I. Tone has succeeded W. H. Cameron as chief engineer of the Willys-Overland Co. Mr. Tone for the past year has been the Marion engineer. Before that he was connected with the American.

DONALDSON JOINS TRACY

New York, March 25—Henry F. Donaldson, president of the Society of Automobile Engineers and former editor of the Commercial Vehicle, has associated himself with Joseph Tracy, the former Locomobile racing driver, as consulting engineer.

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Wider Roads Movement

THESE are good road days. Days when the rank and file are interested and not simply the man who has building material for sale, the man who has road-making machinery for sale and the man who has a good road's address to give. These are days of action, days when the average man who is interested is just as ready to help out financially as he is to personally make a trip over a certain route with the object of deciding on a scheme of improvement or construction of a new highway.

THESE days of good roads have been brought about by the road user, the man who owns a motor car and who uses it on the country highways. These improved roads have not been brought about by the horse user, except in a few sections, where road improvement began over a decade ago at a time when the motor car was not a quantity worthy of consideration in said territories. It is to the owner of the motor car that the majority of the present good roads activity must be credited. He was the first person to individually insist on better roads. Before his day people had talked of improved highways: The good roads lecturer told in endless columns of figures about the number of miles of unimproved highways in America, of the few miles of improved roads, of the miles of stone road, of the tens of thousands of miles of dirt roads and the miles upon miles of unimproved roads. His figures amazed his auditors but did little to stimulate. So vast did the road improvement problem appear that many recoiled from it, dumfounded at its proportions and preferring to hold aloof rather than mix in with a losing movement.

THANKS to the man who drives a car, the movement got started. He did not sit down and figure out how many miles of unimproved roads there were in his state, he did not figure out the number of miles of stone road that might be built every year by the state convicts if they were only worked on the highways, he did not spend idle days going over the costs of building main highways such as France has, but started at his own door. The road leading from his town to the nearest suburb needed improvement. He started a movement in his own block to get some oil sprinkled on it in the summer to keep the dust down. The next year he had a movement started to have a stone covering put on the highway, and it went through. As a third step he organized a local improvement society covering half a dozen town blocks to sprinkle the streets and keep the walks clean. The lessons learned from small instances of actual work and co-operation bred a desire for bigger things. The road to the nearest town was passable only in dry months, the remainder of the time the car was useless for country travel. This started the city-to-city road movement which soon developed, as has been the case with many states, to the trans-state highway in which nearly every person along the highway has been made a worker for good roads.

ACTIONS speak louder than words in the good roads field. Conventions from January 1 to December 31 will not build 1 mile of road unless some practical member of the convention can arouse the people to work. The state of Iowa with over half a dozen main highways across the state has as strong a good roads spirit as any state in the union. Iowa has not been building stone roads but has been dragging its present dirt roads. By constantly dragging these roads, and by the constant use of the road scraper every farmer along these trans-state roads has been made a good roads booster. But many a farmer has been made a purchaser of motor cars. When a farmer does some actual work, such as dragging a road, he at once wants to make some use of his own road. The spirit of travel has been born in him. The circle of horse transportation has been widened to the circle of motor car usefulness. By improving its roads the state of Iowa has done more actual advertising for the motor industry than could possibly have been obtained in any other way.

YET other states, that want to sow the good roads seed, so that it will grow and bear fruit, start with the people along either side of the road. The old talk of how the farmer will benefit by the improved highway may not reach him, but once let him feel the benefits of good roads and you have him for keeps. Let him drive his two-horse team with its ton load to market over an improved highway and he will in one lesson see the reduction of effort on his horses, he will see how much time can be saved and he will work ever afterwards for good roads.

THERE are hundreds of car owners who were not good roads workers until they visited one of the eastern states and spent a week or so driving over the improved highways of New York, Connecticut, Massachusetts or some of the adjoining states. These drives created the appetite, the appetite that could not be quenched. Ever since they have avowed that they will work until every road in their own locality has been improved. It is a fact that the use of a good road is the best educator.

MANY localities with poor roads have resigned themselves to the continued use of them until some utopian time when they imagine they will have money enough to build a bitulithic macadam road, and until that time they do not see that they can do anything to improve their local roads. Such people are working along the impossible line. That district that cannot improve its dirt roads into rational dirt roads by dragging or other means will not be able to build or even take care of stone roads were they given to them as a present. The good roads seed must be developed in the hearts of the people. You cannot go in one jump from the corduroy to the bitulithic. The progress must be a gradual one, an educative one. This is why such states as Iowa are making commendable progress. They have educated their people to improved roads, and these people will not be content with a dragged highway but when it is obtained will be looking forward to stone roads, and from stone highways to more improved and permanent ones.

IN some of the southern states where the good roads movement has not taken hold as it has with others there is a deplorable tendency to leave everything alone until all can be done. Streams are without culverts but they refuse to build a culvert until, as they imagine, a stone road will be built. The better, in fact, the only policy, is to improve in a modest way, get the good roads enthusiasm moving in a small way at first and soon it will become a movement of such proportions as to be able to handle the biggest projects in road improvement. The old adage that "great oaks from little acorns grow" is specially true with regard to the good raods movement in this country.

Milwaukee Would Take Up Road Racing

MILWAUKEE, WIS., March 26—The Vanderbilt cup and the grand prix will be contested for at Milwaukee in the fall of 1912 if the herculean efforts of the Milwaukee Automobile Dealers' Association, assisted by other agencies, such as the Milwaukee Automobile Club, Merchants' and Manufacturers' Association and Citizens' Business League are prolific of results.

It leaked out this afternoon that the M. A. D. A. has been working quietly since the last running of the two classics at Savannah to bring the races to Milwaukee this year. In fact, the arrangements have progressed so much that about all there is to be done is to get the sanctions of the various official bodies associated with the conduct of the events to let Milwaukee have them.

The Milwaukee association has practically closed contracts for the lease or use of a triangular stretch of level highway, from 11 to 13 miles long, in the town of Wauwatosa, Milwaukee county, for a certain period, which will cover the reconstruction of the road, practice time and the actual running of the races. It has gained the consent of the governor of Wisconsin to use as many companies of the state militia as necessary to police the course at the expense of the association. Bids for the erection of a huge grandstand and several bleachers at various points on the course have been received from contractors and a contract can be awarded at a moment's notice.

The association has received intimations that the two big contests will be held here under certain conditions, which the association is ready to comply with.

It is believed that a big racing association will be organized with local capital to have the conduct of the arrangements and running of the events. The M. A. D. A. is acting simply as initiator of the plans.

George W. Browne, 460 Milwaukee street, Milwaukee, state agent for the Overland and Marmon, is taking the lead in the matter and is assisted by a committee from the M. A. D. A.

ORGANIZE AT MILWAUKEE

Milwaukee, Wis., March 26—Judge John C. Karel, of Milwaukee, was elected president of the Chicago-Milwaukee Good Roads Association at the first meeting of directors elected at the formal organization meeting following a noon luncheon in the Hotel Pfister today. Five vice-presidents were elected, as follows: Allen S. Ray, Frank X. Mudd and J. T. Brown, of the Chicago Automobile Club; Lee A. Dearholt, president Milwaukee Automobile Club; Isaac G. Hickman, president Milwaukee Automobile Dealers' Association.

Dealers' Association Bidding for Both Vanderbilt Cup and the Grand Prix

James T. Drought, secretary of the Wisconsin State Automobile Association and counsel of the M. A. C., was elected secretary. George A. West, treasurer of the W. S. A. A. and a director of the M. A. C., was elected treasurer.

More than 100 good roads enthusiasts attended the luncheon. Unfortunately, Chicago was represented by only a small delegation. Awaiting a more favorable attendance from the other end of the proposed improved highway, the route was left open. It is practically certain, however, that the inside route will be selected for the work of the association rather than the lake shore route. To rebuild the latter road would require tens of thousands of dollars, while from $5,000 to $10,000 will put the inside route in excellent condition. The preferred route leaves Milwaukee at Layton boulevard, down the Kilbourn road, through Russell at the state line, through Gurnee, Libertyville, Halfday, Wheeling and Niles, entering Chicago at Milwaukee avenue.

JERSEY RECIPROCITY DOOMED

Trenton, N. J., March 26—The legal situation again is tangled up and it looks as if the hoped-for reciprocity bill which passed the house by an overwhelming majority is doomed to defeat; in fact, the motorists are sure of it because of the opposition which it has met in the senate, where eleven of the senators have lined up in opposition to it. It is expected a substitute measure, possibly the Gaunt bill, will be put through.

The trouble seems to be over the clause eliminating the provision of the existing law which requires non-residents to sign a power of attorney constituting one of the state officials the legal representative of the visitor, to receive service in case of any infraction of the law on the part of the visitor. The eleven senators in question are opposed to this elimination of this clause.

The senate today declared in favor of the trackless trolley bill which authorizes the formation of corporations to operate power-propelled passenger cars as rivals or auxiliaries for the regular track-trolley lines or the railroads.

The intent of the bill is to provide legal foundation for a system of transportation that will make certain outlying sections of the state available for residence. Senator Smalley was not successful in getting the measure through in the earlier stages of the session and today it passed by the narrowest margin.

TIRE-DATING BILL MADE A JOKE

New York, March 26—The tire-dating bill has had its teeth pulled in the New York legislature and now may be passed without causing anybody any uneasiness. The amendments tacked on relieve the manufacturer from any responsibility for dating the tires and placed the responsibility upon the retail dealers. As the retailer has no means of knowing the date of manufacture, the situation is rendered opaque. It also allows the dealer to apply the date with a rubber stamp in some inconspicuous place. The other amendment provides for the measure taking effect January 1, 1914.

NEW ORLEANS GETS TOUR START

New Orleans, La., March 27—With the return of Frank M. Joyce from Panama yesterday a contract was signed to make this city terminus of the A. A. A. reliability tour. The Louisiana Motor League and the dealers' association pledge the $4,500 guarantee required. It is announced that the route will lay through Memphis. Mr. Joyce has no idea which city will be selected for the start. The Panama feature was abandoned as part of the tour, but most members will make the trip, leaving their cars here. A local bank sent a handsome loving cup to the meeting to be awarded the first car entering the city.

Coming Motor Events

April 27—Speedway race; Los Angeles motordrome; Los Angeles, Cal.
May 4—Road race; Motor Car Dealers' Association; Santa Monica, Cal.
May 14-17—Commercial reliability run Chicago Motor Club, Chicago, Ill.
May 17-18—Track meet; Colorado State Automobile Association; Denver, Colo.
May 30—Indianapolis speedway, 500-mile race; Indianapolis, Ind.
May 30—Track meet; Salem, N. H.
June 20—Algonquin hill-climb, Chicago Motor Club; Algonquin, Ill.
June—Reliability run; Auto Club of St. Louis, St. Louis, Mo.
June—Hill climb; Maine Automobile Association; Portland, Me.
July—Road race; Riverhead, L. I.
July 4—Track meet; Petersburg, Ind.
July 4-5—Track meet; Taylor Automobile Club; Taylor, Tex.
July 4-6—Beach meet; Old Orchard Automobile Association; Old Orchard, Me.
July 15—Reliability run; Wisconsin State Automobile Association; Milwaukee, Wis.
August 8-10—Galveston beach meet; Galveston, Tex.
August 23-24—Road races; Chicago Motor Club; Elgin, Ill.
October 5—Fairmount Park road race; Quaker City Motor Club; Philadelphia, Pa.
September 2—Speedway meet; Indianapolis, Ind.
September Track meet; Universal Exposition Co., St. Louis, Mo.
October 7-11—Chicago Motor Club reliability run; Chicago.
October 12—Track meet; Rockingham park; Salem, N. H.
November 6—Track meet; Shreveport Automobile Club; Shreveport, La.

Cleveland Debates on Motor Topics

Engineering Society for First Time Hears Speakers from Car Industry—Entz of White Talks on Long-Stroke, Carbureter and Magneto, Anderson of Winton on Self-Starters and Sterling, Stearns, on Valve Designs

CLEVELAND, O., March 26—With the president, E. P. Roberts, as chairman, the Cleveland Engineering Society tonight opened its first meeting devoted to motor car design. The whole evening was devoted to illustrated lectures on the motor car engine. The speakers were J. B. Entz, engineer of the White Co.; James G. Sterling, engineer of the F. B. Stearns Co., and H. B. Anderson, engineer of the Winton Motor Carriage Co. Although the audience was composed principally of engineers, the discussions were somewhat elementary as the hearers were most of them in other lines than that of the motor industry. In his paper on motor-starting devices, H. B. Anderson divided the starters in a rather novel way. He classified them under kinetic and potential starters. He said in part:

"Kinetic devices owe their development to engineers, while those of the potential type principally owe their existence to the fact that the addition of water to calcium carbide forms acetylene gas. Kinetic starters, by diverse means, produce rotation of the crankshaft, depending upon the motor functions to succeed such action; in other words, assuming that a proper mixture will enter the cylinder and be ignited. Such mechanisms are cranking devices and not starters.

"Potential starters depend upon having or placing in the cylinders a combustible mixture of some hydrocarbon and air, and, to use the accepted term, start on the spark. They are priming devices only and depend upon ignition to start. Starting a motor assumes three things as essential—rotation of the crankshaft, carburetion proper, and ignition of the charge. Eliminating any one element precludes a started motor and for that reason it is asserted that this classification of cranking devices and priming devices is correct.

Starters Not New

"Starting devices have taken such a prominent position that one is almost inclined to think them a matter of recent development. As long ago as 1899 stationary engines were equipped with a hand-pump to force a charge into the cylinder, which was ignited by striking a rod which ignited a match in the cylinder. Charter in 1892 patented a hand-operated pump and carbureter for starting. Ignition of gunpowder by an electric spark was patented in 1899, and a cartridge was used by the Wolseley company in England in 1904. A spring starter is recorded in the patent office in 1900.

"At the Paris salon in 1905 there were several so-called self-starters displayed. The Societe Mors exhibited one consisting of a hand-pump which, in operation, forces a gasoline mixture into the cylinders, afterwards starting on the spark. Cormillean and St. Beuve displayed a ratchet clutch pedal, which at each operation turned the motor a little. De Detrich equipped with the LeTombe device, which consisted of a small air-compressor, which charged a tank and on its shaft had a distributer valve synchronized with the motor.

Original Renault Device

"Renault had a rack and pinion two-cylinder pump-starter called the cyanogene, operated by a carbonic acid tank. Henry Piper displayed a gasoline-electric vehicle with a storage battery, which also accomplished the starting electrically. At the Chicago show in 1906 the Harrison car exhibited a device for starting on the spark after previously admitting acetylene into the cylinders. The foregoing indicates that the general idea involved in all the present starters is old.

"Until the six-cylinder motor was in use an air starter was impractical, inasmuch as in that type, where the engine piston received the air pressure, the air must be admitted on the firing stroke and as the exhaust valve opened approximately 45 degrees previous to the stroke completion, the flywheel could not carry the motor the other 45 degrees. The main difficulty was that at the time the air was cut off another cylinder was reaching its maximum of compression. Chalmers, for this reason, provided a relief port in the air-distributing valve so as to relieve the compression.

"With a six-cylinder motor, where ignition and other functions succeeded each other every 120 degrees, we find that it is possible to have air pressure upon two cylinders at one time, which assures a continuous crankshaft rotation up to the tank capacity. Thirty pounds will turn the motor. This method, of course, cannot put a greater pressure in the tank than that in the cylinder. Running idle 30 pounds is produced; under motor load, as high as 200 pounds may be obtained.

"Several gas starters have proven very satisfactory, but are not in the class with the kinetic devices. Gas starters are much more satisfactory on four-cylinder motors than on sixes, as only one impulse places the motor in motion. In a six there is the internal friction of five cylinders, as against a three or four-cylinder motor, and the fact that the cylinders are on compression at the same time."

Mr. Sterling's talk on valve mechanisms was a discussion of existing types of valve gears. He said in part:

"The measure of efficiency of a valve mechanism is the manner in which it performs its functions. Theoretically this would mean a study of valve-opening diagrams and determination of the intake and exhaust gas velocities, the power consumed in the operation of the mechanism, etc. Practically, however, the measure of the efficiency, as it appears to the builder, is more closely allied to the durability, reliability, simplicity and ease of manufacture of the valve mechanism. To these requisites during the last few years has been added quietness of operation. At the present time it is one of the determining factors in the consideration and is, perhaps, the direct reason for the widespread interest in the Knight type of engine, and for the great amount of study and development now being applied to the valve mechanism of the motor.

Substitutes for Poppet Valves

"In searching for a substitute for a poppet valve, perhaps the most obvious solution to the problem is the substitution of piston valves operated from an eccentric or small crankshaft in place of the cam-operated poppet valves. Up to this time none of the many designs of this type which have been produced has been taken very seriously by manufacturers. As a rule, these mechanisms consist of one or more pistons reciprocated in a valve cylinder into which ports from the working cylinder have been cut. These ports are covered and uncovered by the piston valve during the desired period of valve opening and many ingenious arrangements have been worked out. The location of the valve cylinder with reference to the main cylinder varies in these designs from a location at the side of the main cylinder and parallel to it to a location at right angles to the main cylinder.

"Another obvious solution of a quiet and positive valve action is that of the rotary valve, and many patents on this type have been taken out by designers. This type of valve construction on stationary engine designs have in the past deterred the motor car builder from trying this out. One of the simplest forms of this valve type was that adopted by the Darracq company and was patented by a Frenchman named Henroid. It consists of a cylindrical shaft or sleeve driven at half the speed of the main shaft and located at one side of the cylinders. A semi-circular notch or port is cut in these sleeves opposite each cylinder, and as the sleeve is rotated alternately connects the

cylinder with the inlet and exhaust ports by a proper location of these ports and the desired timing is effected.

"The last valve mechanism to be described is that invented by Charles Y. Knight. It is the first of the so-called non-poppet types of valve mechanism to be adopted by a motor car builder, and up to the present time is the only type to be adopted by other than the original makers. The Knight valve mechanism consists of two concentric sleeves sliding up and down between the walls of the piston and cylinder. Certain slots in these sleeves register with one another and with inlet and exhaust ports in the cylinder at proper intervals to give the desired valve functioning. The two sleeves are operated independently by small connecting rods working from eccentrics on small shafts positively driven by a silent chain at one-half the speed of the crankshaft. The eccentric-pin operating the inner sleeve is given a certain lead or advance over that operating the outer sleeve."

Advantage of Long Stroke

In his talk J. B. Entz stated that the increased power, flexibility and economy of the long-stroke engine was due to the fact that "a 4½ by 4½ engine is of the same cylinder volume as a 4-inch bore by 5¾-inch stroke, but it has an area of piston head 26 per cent greater. If, during the waiting stroke, the pressure per square inch was the same in each case, the total pressure would be 26 per cent greater, but you would get no greater turning effort, as the crank on which it acts is proportionately shorter. The loss in the crankshaft bearings is, however, increased, due to the greater pressure on them, and the fact that the crank pins and mainshaft bearings turn in their boxes but once per revolution, whether the stroke be long or short. The side pressure of the pistons on the cylinder walls is also greater, due to the greater pressure on the larger piston head in the short-stroke motor. The result is a higher mechanical efficiency for the long-stroke motor, as it has less internal friction. The piston weight and connecting rod weight is less in the long-stroke motor, due to the small size of the piston and less pressure on it.

"The wall area of the compression space is less in the long-stroke motor, because of its shape, and the heat units lost are, therefore, less. The long-stroke motor has, therefore, a higher thermal or heat efficiency than the short stroke, and as the thermal efficiency is lowest at low speeds, the long-stroke motor pulls better at low speeds. If the size and lift of the valves are made the same in each case, the volumetric efficiency of the two motors would be the same at the same revolution per minute.

"The extent to which the cylinder is filled on the suction stroke is not determined by the speed of the gases in the cylinder, as they follow the piston on its downstroke, but by the very much higher speed, through the carbureter, inlet passages and valves, which is the same in the case of both engines. Also the rate of expansion of the gas on the working stroke after it has been ignited is not different in the two engines, as in each case the expansion is from the volume contained in the compression chamber to the total volume of the cylinder and this takes place in the same length of time at the same number of revolutions per minute. The best relations of stroke to bore or most practical relations, according to the latest practice, is a stroke 1.4 to 1.5 bore."

Shows New Indicator Card

The speaker introduced a novel valve diagram in illustrating the position of the piston at different valve events. It was taken from a White motor by an indicator of Entz's own design.

"A card taken from an engine with the indicator shows that the exhaust valve opens about 45 degrees before the piston reached the lower center, which in this case was ¾ inch on a 6½-inch stroke. It will be noticed that as the piston movement is slowest around its lowest center, that the valve was half open or more at the lowest center or finish of the power stroke, although it did not commence to open until the power stroke was practically finished. The exhaust valve opens up very rapidly at first in relation to the piston movement, as it should do to permit the easy escape of the exhaust gases. The exhaust valve closes a little past the top center, about 5 degrees, which corresponds to a very small downward movement of the piston on the suction stroke. The inlet valve opens a few degrees after the exhaust closes and as it opened after the piston passed top center.

"The inlet valve opening is smaller in proportion to the piston speed at the beginning of the suction stroke than it is on the last part of the stroke, where it is wide open after the piston speed has commenced to decrease. This is as it should be, as although the piston movement is the actuating force that moves the air and draws it into the cylinder, yet the inertia of the air causes it to lag behind at the first part of the stroke and after it has obtained velocity and momentum, it continues to enter the cylinder even when the piston has reached the end of the stroke and for some distance on the upward stroke. The higher the speed of the engine the more the advantage in the late closing of the inlet valve. But the closing shown is very good, as the valve is half open at the end of the stroke and is closed when the piston has moved ½ inch upward on the compression stroke, thus not permitting of much loss of the charge even at slow speeds."

Some of the prevalent theories as to the speed of gas and air in the carbureter were upset by Entz. He stated in part that "the theoretical amount of air to combine with the gasoline is about 15½ to 1 by weight, but in practice the best mixtures are about 20 to 1. As the vacuum in the carbureter is the force that acts upon both the gasoline and the air, and as the velocity which will be imparted to either is inversely as the square root of their mass or weight, it follows that as gasoline at 60 degrees Fahrenheit weighs about 580 times air, at the same temperature, its velocity when leaving the nozzle is inversely as the square root of 580 or one-twenty-fourth the velocity of the air in the tube around the nozzle. So that if we had a single gasoline nozzle, in a single air tube, through which all the air passed, and the air tube was 1 inch in diameter and the gasoline nozzle was one-twentieth inch, then the quantity of air by weight compared with the gasoline would be first 400 times, because of 400 times the area, multiplied by 24 because of twenty-four times the speed and divided by 580, because of one-five hundred and eightieth the weight. This equals sixteen and one-half times the weight of air to gasoline. As the gasoline leaves the nozzle it becomes finally divided and is carried along with the air at an increasing rate of speed until it would reach the same speed as the air or until it combines with it to form a gas. I mention this fact of the very much slower speed of the gasoline as compared to the air into which it first enters, as I find that many have an idea that the gasoline impinges upon the air like water from a nozzle upon stationary air.

"Theoretically with a nozzle of the given size in a fixed sized air tube, we should get the same proportion of air and gasoline at all engine speeds and throttle openings. But in practice this would give us a mixture that was too rich with wide open throttle and high speeds, and too weak when running slow."

Souther Discusses Papers

The only discussion of the papers was by Henry Souther, ex-president of the Society of Automobile Engineers. In his discussion of Sterling's paper on non-poppet valves, he brought out the fact that engines with positively-controlled valves must be designed to take care of greater horsepower than must poppet-valve engines of the same size, as it is quite possible in the former to provide for sufficient valve area and opening to give any practicable mean effective pressure through a great range of speeds, whereas poppet valves are limited by spring inertia above about 1,500 revolutions per minute. He suggested that one reason for the freedom from trouble in Knight engines is due to the fact that the reciprocation of the sleeves is minimized.

It was suggested during the meeting that a motor car section of the society be organized, but no final action was taken. It is expected, however, the matter will be taken up at a later date.

Indianapolis Has Novelty in Show Line

Annual Exhibition Being Held in Tent Which Covers Three Entire City Blocks, All Under One Roof

INDIANAPOLIS, Ind., March 25.—A novelty in motor shows is being held here this week under the auspices of the Indianapolis Automobile Trade Association, which is holding a show under canvas. It might be said that the association is not giving a canvas show because it particularly favors that kind of an exhibit, but because there is nothing else in the city of sufficient capacity to give a complete exhibit under one roof.

It cost the association about $15,000 to get the show ready to open, but indications are the exhibit will net something on the investment as the out-of-town ticket sales in advance were $7,400. The exhibit was opened at 1 o'clock last Saturday afternoon, when Mayor Samuel L. Shank pulled a rope that hoisted a banner on top of the tent, reading "Why Indianapolis Needs a Coliseum."

This is the first time local tradesmen ever have had a show all under one roof. For several years each concern has exhibited in its own place of business, while all of the dealers and manufacturers have usually united in a parade and other outdoor events. This arrangement, however, has never obtained the results sought. The average visitor refused to walk all over town hunting up individual shows. But the tent seems to have solved the local question in a very satisfactory manner. The city authorities gave permission to block New York, Vermont and Meridian streets, around three sides of University park, and it is here that the tent has been erected. The posters say it is the largest tent ever constructed, and while this statement may be liberal, the tent is nevertheless a mammoth affair.

The tent is approximately 1,300 feet long and 50 feet wide, providing 65,000 square feet of space. There is an aisle through the center, with exhibiting space on each side. The exhibits take up 48,000 square feet of space and additional space could have been sold, had it been available. There are forty exhibitors of cars, twenty-six of accessories and supplies and six of motor cycles. The only identification signs permitted are uniform signs 4 feet by 18 inches with the name of the exhibitor and cars and border in purple. Decorations consist of hundreds of I. A. T. A. pennants, thousands of yards of laurel and flags. Each exhibitor has from 150 square feet to 1,800 square feet of space, and the exhibitors of cars are showing from one to twelve models each.

The show has been advertised extensively throughout Indiana, and considering the fact that the admission fee has been fixed at 50 cents there should be a large attendance. Those in charge of the show are predicting an attendance of 100,000 during the week. In view of the fact that this is the distributing center for Indiana and in some instances for neighboring states, hundreds of dealers are expected to attend, and it is believed many agency contracts and sales will be closed.

CENTRAL NEW YORK SHOWS

Syracuse, N. Y., March 26—The 1912 show cost the Syracuse Automobile Dealers' Association $10,000. While the staging of the show was greater than last year the receipts were just double and the association will be able to declare a good dividend. Next year the exhibition will be held under one roof, using all available space in the infantry and cavalry armories. A flooring will be placed over the tanbark in troop D's drill hall, and as this is the same size as the infantry armory used this year, there will be more exhibit space than was possible this year, even with the use of the Alhambra. A larger entrance between the two armories will be cut through the wall. There will also be added basement space for accessories.

The Watertown show was opened today to continue through the rest of the week. It is the third annual exhibition under the direction of the Watertown association. Forty-five cars are shown, representing thirty-five exhibitors.

CLARK COMPANY BANKRUPT

Indianapolis, Ind., March 23—Notice has been sent to the creditors of the Clark Motor Co., of Shelbyville, Ind., that the concern was adjudged bankrupt on Wednesday. Harry C. Sheridan, referee in bankruptcy, has called a creditors' meeting at the Federal library in this city for Thursday afternoon, April 4. Mr. Sheridan is located at Frankfort, Ind.

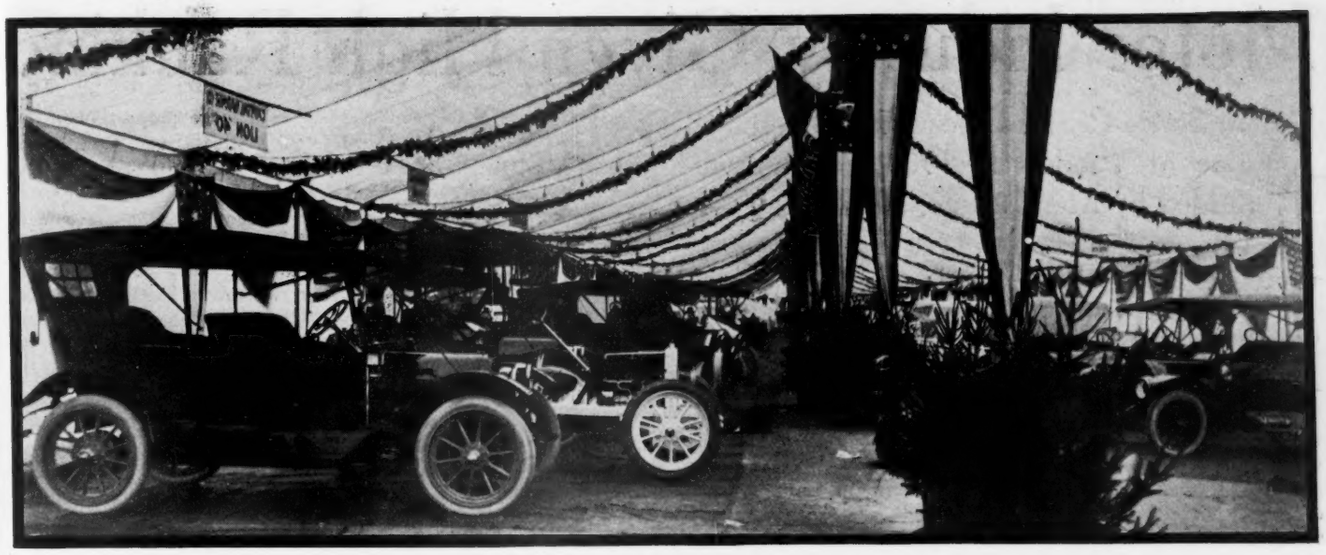
OPEN AIR SHOW PLANNED

Philadelphia, Pa., March 24—A meeting of the recently organized Belmont Motor Club is scheduled for this week, when plans for an open-air show to be held under canvas on the track at Narberth will be formulated, the event to take place during a week in May. In connection with the exhibition a series of races is contemplated.

WICHITA'S FIRST SHOW

Wichita, Kas., March 23.—Exceeding the highest expectations and fulfilling the predictions of the committee, the first annual show held in Wichita was a success in every respect. Although Wichita's

EXTERIOR APPEARANCE OF TENT SHOW NOW BEING HELD IN INDIANAPOLIS



INTERIOR VIEW OF TENT SHOW AT INDIANAPOLIS

Forum is one of the largest convention halls of the United States, it did not contain space enough for the local dealers to exhibit their cars. More than 100,000 feet of space was filled with the cars. In spite of the weather, which was very unfavorable, over 10,000 persons attended. Every foot of space in the arcade of the forum was filled with displays of accessories.

BUFFALO'S MILLION-DOLLAR VENTURE

Buffalo, N. Y., March 27—During the past week the Buffalo Electric Vehicle Co. filed papers of incorporation at Albany with Secretary of State Lazansky. The directors named in the papers are Buffalonians, including William J. P. Seipp, W. G. Feuchter, Thomas R. Wheeler, Frank G. Lane and Marcus A. Alexander. John W. Van Allen, an attorney of the firm of Wilcox, Bull & Van Allen, Buffalo, is counsel for the new concern.

In the incorporation papers the capital of the new company is given as $1,000,000, of which $700,000 is common stock and $300,000 preferred. The concern is to manufacture electric pleasure and commercial motor cars. There is a prevalent belief among local dealers that this new concern is a merger of five or six Buffalo motor companies, but this is denied by Attorney Van Allen.

INVESTIGATE FINDLAY PLANT

Findlay, Ohio, March 23—It is reported here that several capitalists representing established Detroit car factories have visited Findlay within the past few weeks looking over the Findlay Motor Co. plant, which is now in the hands of a trustee, John M. Barr. This condition has existed for 6 months. Those who might verify the report will not speak of the matter. The plant is one of the best equipped in the country and was organized and put into running condition by L. E. Ewing, who came here from Cleveland. He interested local capital to the extent of more than $100,000.

Cold Mars Denver's Show

Despite Adverse Weather, Record for Attendance and Sales is Broken

DENVER, COLO., March 22—The eleventh annual Denver show closed last Saturday after having broken all previous records for attendance and sales. The show was preceded by several weeks of snow and cold, but on the opening day the weather cleared and gave promise of a week which would attract many outside visitors to the city, but after the initial night the cold resumed its sway and probably seriously interfered with the number of visitors. Though the attendance increased over other years, the advance was not so great as had been hoped for.

That Denver is rapidly assuming its place as the motor center of the entire west was shown by the geographical distribution of the registered visitors. Names from Phoenix, Ariz.; Salt Lake City, Utah; Portland, Ore.; South Dakota and Texas were noted. There were approximately 800 more outsiders here for the week than there were last year.

Dealers do not report large sales as a direct result of the show, but there are only a few who do not feel that it was a worth-while enterprise and a stimulus to motor trade in general which will be felt in the season that is now opening.

The exclusive feature of the Denver show which appeared nowhere else in the country was the new Continental truck which is being promoted here now by the Continental Motor Truck Co. It is a gasoline-electric drive of a unique design and was planned by R. S. McKeage. It presents some features which have not been generally adopted by American truck manufacturers but which experience of European truck experts have shown practicable. The power for the dynamo is generated by a Continental four-cylinder gasoline engine. The dynamo is a Westinghouse model C of 125 volts. The power is delivered to the wheels through two Westinghouse motors of 110 volts and double roller chains. All chains are covered with dustproof aluminum covers and run in oil. The wheels are steel and fitted with solid tires. The front tires are 36 by 4 single and the rear are 38 by 4 double. The Ross patent steering gear is used and internal expanding brakes of 16½ by 4 inches surface. The capacity of the present model is 3 tons. The wheelbase is 142 inches, the tread 58.

The truck is fitted with a Westinghouse continuous torque controller which has three positions. The first position is for heavy torque and hard pulling and the motors are in series; in the second position the motors are in parallel for higher speeds under ordinary conditions; in the third series the motors are connected in parallel with commutated fields which permits rapid running without load. The speed loaded varies between 7 and 10 miles per hour, while the empty truck can attain a speed of 12 to 15 miles per hour.

The officers of the Continental company are: W. S. Copeland, president; Charles Kirk, vice-president, and J. F. Gunthorpe, secretary and treasurer. The company plans to enlarge its plant almost immediately and install equipment.

RICHMOND DEALERS ORGANIZE

Richmond, Va., March 25.—For the purpose of protecting and promoting the interests of members and purchasers of cars and accessories, the Richmond Automobile Dealers' Association was formed on the night of the 22nd, with the following officers: L. M. Foster, president; Joseph F. Leonard, vice-president; D. W. Richards, treasurer. The office of secretary will be filled later. The board of directors is composed of L. A. Folger, R. B. Allport, Mark R. Lloyd and Nixon Ball. These together with the officers will name the secretary who will be a salaried officer.

Motor Industry Given High Ranking

United States Census Bureau, in Interesting Report, Estimates Value of Product in 1909 as $249,202,000—Value Added by Manufacture, $117,556,000—Government Goes into Details as to Big Business

WASHINGTON, D. C., March 25—The motor industry ranks nineteenth in the number of wage-earners, twenty-second in the value of products and seventeenth in the value added by manufacture, according to a statement issued today by Director Durand of the bureau of the census, department of commerce and labor, which shows the relative importance of the leading manufacturing industries in the United States, each having a gross value of products of $100,000,000 or more in 1909. The figures were prepared by William M. Steuart, chief statistician for manufactures, and is preliminary to an advance bulletin now in press. According to this, in 1909 the motor industry, including those concerns making bodies and parts, employed 75,721 wage-earners; the value of its product was $249,202,000 and the value added by manufacture was $117,556,000.

Statistics Interesting

The statement is interesting. It presents for each industry the average number of wage-earners, the value of products and the value added by manufacture, which last named item is obtained by deducting the cost of materials consumed from the value of products. It gives, also, the percentages of increase in the average number of wage-earners and the value of products from 1899 to 1909.

The statement points out that the number of wage-earners and the value added by manufacture are, on the whole, a better measure of the relative importance of manufacturing industries than the gross value of products. The census of 1909, like that of 1904, was confined to manufacturing establishments conducted under the factory system, as distinguished from the neighborhood, hand and building industries.

In the table below the industries are arranged in the order of their gross value of products, but their rank in respect to the other items is also shown. Some of the industries which hold a very high rank in gross value products rank comparatively low in the average number of wage-earners employed, and in the value added by manufacture. Where this is the case it indicates that the cost of materials represents a large proportion of the total value of products, and that, therefore, the value added by manufacture, of which wages constitute usually the largest item, is not commensurate with the total value of products.

Thus the slaughtering and meat packing industry, which ranks first in gross value of products, and the flour mill and grist mill industry, which ranks fifth in that respect, both hold a comparatively low rank with regard to number of wage-earners and value added by manufacture. The blast furnace industry, the smelting and refining of copper, the manufacture and refining of sugar and molasses, the manufacture of butter and cheese and condensed milk, the refining of petroleum, and the smelting and refining of lead are other industries which rank much higher in gross value of products than in the number of wage-earners, or the value added by manufacture.

Motor Car Standing

There are several industries the rank of which, according to the number of wage-earners, and the value added by manufacture, is decidedly higher than the rank according to value of products; in other words, the cost of materials is relatively a smaller or the wages relatively a higher part of the total value of products for these industries than for most others. Among the industries of this class

RANKING OF BIG AMERICAN INDUSTRIES AS SHOWN BY CENSUS REPORT

	Wage-earners Average No.	Rank	Value of products Amount	Rank	Value added by manufacture. Amount	Rank	Per cent of increase Average No. wage-earners 1899 to 1909	Value of Products 1899 to 1909
All industries	6,615,046	..	$20,672,052,000	..	$8,530,261,000	..	40.4	81.2
Slaughtering and meat packing	89,728	16	1,370,508,000	1	168,740,000	12	29.5	73.8
Foundry and machine shop products	531,011	2	1,228,475,000	2	688,464,000	1	24.4	53.9
Lumber and timber products	695,019	1	1,156,129,000	3	648,011,000	2	36.6	51.9
Iron and steel, steel works and rolling mills	240,076	6	985,723,000	4	328,222,000	4	31.0	65.1
Flour mills and grist mills products	39,453	30	883,584,000	5	116,008,000	18	22.4	76.2
Printing and publishing	258,434	5	737,876,000	6	536,101,000	3	32.4	86.7
Cotton goods, including cotton, small wares	378,880	3	628,392,000	7	257,383,000	7	25.1	85.3
Clothing, men's, including shirts	239,696	7	568,077,000	8	270,562,000	6	52.1	75.4
Boots and shoes, including cut stock and findings	198,297	8	512,798,000	9	180,060,000	10	31.1	76.8
Woolen, worsted and felt goods, and wool hats	168,722	9	435,979,000	10	153,101,000	15	29.1	75.2
Tobacco manufacture	166,810	10	416,695,000	11	239,509,000	8	25.9	58.0
Car and general ship construction and repairs by steam railroad companies	282,174	4	405,601,000	12	206,188,000	9	62.5	86.0
Bread and other bakery products	100,216	14	396,865,000	13	158,831,000	14	66.5	126.3
Iron and steel, blast furnaces	38,429	31	391,429,000	14	70,791,000	30	2.1	89.3
Clothing, women's	153,743	11	384,752,000	15	175,964,000	11	83.6	141.5
Smelting and refining, copper	15,628	38	378,806,000	16	45,274,000	36	38.0	129.4
Liquors, malt	54,579	25	374,730,000	17	278,134,000	5	38.3	58.2
Leather, tanned, curried and finished	62,202	23	327,874,000	18	79,595,000	27	19.4	60.7
Sugar and molasses, not including beet sugar	13,526	41	279,249,000	19	31,666,000	41	4.3	16.5
Butter, cheese and condensed milk	18,431	36	274,558,000	20	39,012,000	39	44.0	109.9
Paper and wood pulp	89,492	17	267,657,000	21	102,215,000	21	53.0	110.2
Motor cars, including bodies and parts	75,721	19	249,202,000	22	117,556,000	17	3,278.9	5,148.6
Furniture and refrigerators	128,452	13	239,887,000	23	131,112,000	16	41.8	83.6
Petroleum refining	13,929	40	236,998,000	24	37,725,000	40	14.2	91.2
Electrical machinery, apparatus and supplies	87,256	18	221,309,000	25	112,743,000	20	107.7	139.4
Liquors, distilled	6,430	43	204,699,000	26	168,722,000	13	72.8	111.5
Hosiery and knit goods	129,275	12	200,144,000	27	89,903,000	23	54.5	108.8
Copper, tin, sheet iron products	73,615	20	199,824,000	28	87,242,000	25	92.1	155.0
Silk and silk goods, including trowsters	99,037	15	196,912,000	29	89,145,000	24	51.4	83.6
Smelting and refining, lead	7,424	42	167,406,000	30	15,443,000	43	10.8	4.6
Gas, illuminating and heating	37,215	32	166,814,000	31	114,386,000	19	65.7	120.3
*Carriages and wagons and materials	69,928	21	159,893,000	32	77,942,000	28	5.3	15.6
Canning and preserving	59,968	24	157,101,000	33	55,278,000	31	5.2	58.2
Brass and bronze products	40,618	29	149,989,000	34	50,761,000	34	49.5	69.2
Oil, cottonseed and cake	17,071	37	147,868,000	35	28,035,000	42	55.1	151.8
Agricultural implements	50,551	26	146,329,000	36	86,022,000	26	8.5	44.6
Pat. med. and compounds and druggists' preparations	22,895	35	141,942,000	37	91,566,000	22	20.3	59.9
Confectionery	44,638	27	134,796,000	38	53,645,000	32	66.2	122.3
Paint and varnish	14,240	39	124,889,000	39	45,873,000	35	46.8	79.5
Cars, steam railroad, not including operations of railroad companies	43,086	28	123,730,000	40	44,977,000	37	28.8	36.7
Chemicals	23,714	34	117,689,000	41	53,567,000	33	24.7	87.6
Marble and stone work	65,603	22	113,093,000	42	75,696,000	29	57.4	77.6
Leather goods	34,907	33	104,719,000	43	44,692,000	38	19.2	73.3
All other industries	1,634,927	..	4,561,002,000	..	2,084,399,000	..	46.9	100.7

are the making of women's clothing, the manufacture of motor cars, furniture, electrical machinery, apparatus and supplies, hosiery and knit goods and agricultural implements, and the confectionery and marble and stone work industries.

The foundry and machine shop industry, the lumber industry, the steel works and rolling mills, the printing and publishing industry, the manufacture of cotton goods, of men's clothing, and of boots and shoes all rank among the first ten industries of the country on each of the three bases shown in the table.

Taxes Are Included

The figures for both value of products and value added by manufacture in the case of the brewery and distillery industries include a very large amount of tax paid to the federal government, and are, therefore, misleading as an indication of the relative importance of these industries from a purely manufacturing standpoint. Their importance is best shown by their rank in number of wage-earners; in this respect the brewery industry ranks twenty-fifth among the industries of the country and the distillery industry forty-third.

There are very great differences among the several industries with respect to the percentages of increase in the number of wage-earners and the value of products. The great majority of the industries, however, show an increase in both items for the decade, the exceptions being iron and steel, blast furnaces, sugar and molasses and carriages and wagons, which decreased in average number of wage-earners, and smelting and refining lead, which decreased in average number of wage-earners and value of products.

Praise for Motor Industry

By far the highest percentages of increase are shown for the motor car industry, the gross value of products of which increased more than fiftyfold during the decade. Other industries which show exceptionally large increases are copper, tin and sheet iron; oil, cottonseed and coke; clothing, women's, electrical machinery, etc.; smelting and refining copper; bread and other bakery products; confectionery; gas, illuminating and heating; liquors, distilled; paper and wood pulp; butter, cheese and condensed milk; hosiery and knit goods; petroleum refining; chemicals; printing and publishing; malt liquors; cotton goods; silk and silk goods; and furniture and refrigerators.

It is interesting to note that the group of "all other industries," which includes the less important industries of the country, shows greater percentages of increase than all industries combined, thus indicating an increased tendency toward diversification in manufacturing industries of the United States.

Detroit Maker Censures Railroads

Thomas Neal, President of General Motors, Claims Industry in Michigan Metropolis Is Handicapped by Poor Transportation—May Erect New Cadillac Plant Elsewhere Because of Lack of Freight Facilities

DETROIT, MICH., March 25—That Detroit is in danger of losing its standing as the center of the motor industry of the country is the inference that apparently is to be drawn from a statement just made public by Thomas Neal, president of the General Motors Co. in connection with the freight congestion that has existed all winter. Mr. Neal declares that unless the railroads entering Detroit show a great improvement in their freight service in the near future the Cadillac Motor Car Co., one of the largest and most important of the General Motors group of plants, will choose some other city as a location for a large additional plant the company is about to build

Cadillac Makes Threat

"The Cadillac company is affected in two ways," said Mr. Neal. "First, its officials are now confronted with the fact that they cannot get materials en route with which to keep the plant going, and if the situation is not relieved at once, production necessarily must be curtailed; second, they are not receiving from the railroad companies enough cars to ship their finished product, with the result that they have accumulated more finished motor cars than they have capacity to store and, as a consequence, are again stalled. The company has its entire output sold right up to the limit of its present capacity and so every hour's production delay now is necessarily a serious matter.

"Because the present plant is adequate to take care of only the present demand, we have in mind an extension to the plant, and the board of directors has given the matter serious consideration. But we probably would not build this in Detroit. In view of the fact that the railroads entering Detroit have proven themselves unable to care for the present needs of the manufacturing interests, do you suppose any sensible board of directors would consider for a moment the desirability of expending a million dollars in a plant only to find, when they were ready to ship their product, they had no means of shipping it?

"There is only one answer: Erect the plant in some city outside of Michigan, where adequate shipping facilities could be had. What particular cities we have in mind we are not prepared to discuss, but there are a number of points under consideration in Ohio, Indiana and Illinois.

"I am not criticising the railroads which now enter Detroit. We are simply facing a business condition. We are making a product that is in demand and the railroads are not serving us satisfactorily. They do not seem to be able to offer us definite assurances that they can or will. The officials, undoubtedly, would like to do so and they probably regret their inability as much as we do. The reason for the railroads overlooking the necessity for properly caring for the shippers is simply this: The public has been and is being misled by exaggerated statements of politicians, magazines and the press, and so long as that is continued business conditions are bound to be hampered, and the city of Detroit, about the only city in the country where there is any real activity in the manufacturing line, is going to pay the penalty. Why? Simply because the railroads evidently cannot finance extensions or improve their terminals and equipment, or at least they are not doing it.

"We are confronted by another serious situation, the possibility of two famines, one in coal and the other in grain, not because there is any lack of these products, but because of the inability of the railroads to transport them in sufficient quantities to properly supply all sections. The only remedy for this condition, in my opinion, is a complete change in public sentiment. In the meantime, however, the individual manufacturer must do the best he can for himself. So, if the railroads entering Detroit can no longer take care of our needs, there remains but one thing to do—locate any additional plants where we can be assured of adequate facilities."

Activity Elsewhere

If there is to be an exodus from Detroit it is not due to begin for a while yet, however. The spring season is opening up with a rush and most of the factories are taking on additional help. The Studebaker Corporation is advertising for Landis grinders, National Acme operators, hammermen and a first-class Ajax upsetter for its Detroit plants. The Northway Motor Mfg. Co. wants a number of boring mill hands, milling, drilling and lathe hands; the Chalmers company can use at once a number of road testers, turners, repairmen, final inspectors, final assemblers; the Buick Motor Co., of Flint, is in need of backhangers and top builders, while the Briscoe Mfg. Co. is advertising for assemblers and solderers on radiators. Everything points to an unusually busy spring season in all branches of the industry locally.

Routes and Touring Information

CARLETON, NEB.—Editor Motor Age —In the Routes and Touring pages of Motor Age for March 7, Webster, S. D., wants to know the best route from Minneapolis to Portland, Ore., and he is directed from Des Moines, Ia., by way of Guthrie Center and Omaha which is 20 miles out of the way. From Des Moines to Atlantic City tourists should take the White Pole road which is better going. I know for I have been over it. If they want to go by way of Denver, leave Omaha on Center street for Millard and go straight south across the Platte river at Louisville and on to Lincoln. From Lincoln to Holyoke the road is well marked and worked.—N. P. Brown.

The White Pole road leaves the river-to-river road at Ortonville and continues through Dexter, Stuart, Menlo, Adair, Anita, Atlantic, Lewis, Oakland, Carson and Council Bluffs. The road from Omaha by way of Lincoln takes tourists through Friend, Fairmont, Sutton, Harvard, Hastings, Minden, Holdrege, Oxford, Arapahoe, Indianola, McCook, Culbertson, Palisade, Imperial, Holyoke, and Sterling.

GOING TO FLORIDA

Litchfield, Ill.—Editor Motor Age—I am contemplating a motor trip to Jacksonville, Fla., as soon as the weather and road conditions will permit, and would be glad to have any information relative to road maps to that point, either from St. Louis, Indianapolis or Cincinnati, as I am familiar with the route to any of these cities, and could make either one of them a starting point.—C. M. Ridgely.

From Indianapolis the shortest route lies through Louisville, Ky., and takes the tourist through Seymour, Uniontown, Gruthersville, Scottsburg, Vienna, Underwood, Henryville, Memphis, Sellersburg and New Albany.

To Nashville through the Blue Grass state, which is full of historical places of interest, takes you through Fern Creek, Mt. Washington, High Grove, Bardstown, New Haven, Athertonville, Buffalo, Magnolia, Hardyville, Uno, Bear Wallow, Cave City, Glasgow Junction, Oakland, Bristow, Bowling Green,

Claims Route Is Better

Franklin, White House, Tenn., and Goodlettsville. The Lincoln Farm, which is a short distance from Athertonville, and the Mammoth Cave out from Cave City should be visited. Fayetteville, Huntsville, Scottsboro, Bridgeport, Jasper, Chattanooga, Lafayette, Rome Cartersville and Marietta take you into Atlanta. A short cut from Nashville to Chattanooga is through Murfreesboro, Manchester, Tracy City and Jasper. Chattanooga to Atlanta, Ga., lies through Lafayette, Summerville, Rome, Cartersville, Acworth, Kennesaw, Marietta; Atlanta to Macon—Jonesboro, Lovejoy, Hampton, Pomona, Griffin, Milner, Barnesville, Forsyth, Smarrs, Bolingbroke, Loraine; Macon to Jacksonville—Hawkinsville, Abbeville, Fitzgerald, Douglas, Waycross.

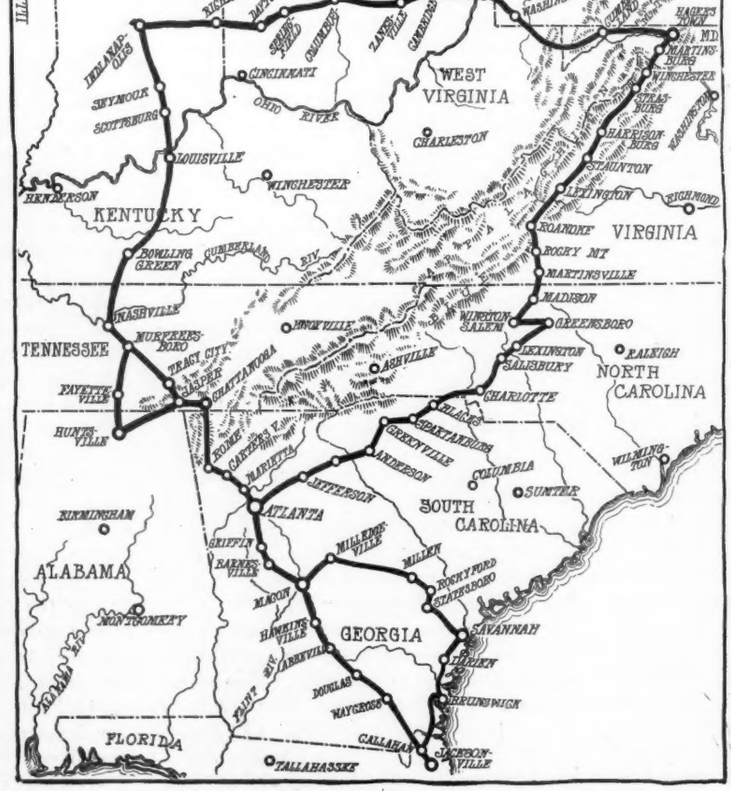
Should you desire to motor to Savannah and thence along the coast to Jacksonville from Macon, go through Milledgeville, Sandersville, Davisboro, Louisville, Waynesboro, Perkin, Millen, Scarboro, Rockyford, Statesboro, Stilson, Savannah, Riceboro, Eulonia, Darien, Brunswick, Old Sterling, Tarboro, Owens Ferry, Kings Ferry and Callahan. At Darien you can secure a Darien-Dents landing ferry for $5; at Owens Ferry and Kings Ferry the charges are $1.

Perhaps you wish to make a longer trip and one of that nature would take you to Hagerstown, Md., thence south through the Virginias and the Carolinas. Traveling on the old national pike from Indianapolis pass through Cumberland, Greenfield, Ogden, Louisville, Dublin, Cambridge City, Centerville, Richmond, Eaton, New Lebanon, Dayton, Harshman, Fairfield, Enon and Springfield, where you will find mostly excellent gravel pike roads following through Harmony, Vienna, Brighton, Somerford, Lafayette, W. Jefferson, Alton and Columbus.

Continue through Granville, Newark, Hanover, Nashport, Irville, Zanesville, Bridgeville, Norwich, New Concord, Cambridge, Washington, Elizabethtown, Fairview, Hendrysburg, Morristown, Lloydsville, St. Clairsville, Bridgeport, Wheeling, West Alexander, Claysville and Washington.

Between Cambridge and Wheeling there is a toll road most of the way, beyond that point you will encounter a hill road with many turns, patches of macadam; but most of the way either fair country road or worn pike. This is not a good road for rainy weather, but good time can usually be made in settled weather. From Washington traveling towards the coast go through Beallsville, Brownsville, Uniontown, Somerfield, Keyser's Ridge, Grantsville, Cumberland, Bedford, McConnellsburg, Chambersburg, Greencastle, Hagerstown.

The New York-Atlanta highway is traversed now through Tilghmantown, Battlefield of Antietam, Sharpsburg, Shepherdstown, Halltown, Charlestown, Clifford and Berryville. A trifle shorter route from Hagerstown lies through Williamsport, Martinsville, Clarksville, Bunker Hill, Ridgeway, Clear through Stephen City, Middletown, Strassburg, Maurertown, Woodstock, Edinburg, Mount Jackson, New Market, Lacey Springs, Harrisonburg, Mount Crawford, Burkstown, Verona, Staunton, Minte Springs, Breenville, Midway, Fairfield, Lexington, Fancy Hill, Natural Bridge, Buchanan, Troutville, Cloverdale, Roanoke.



OPTIONAL ROUTES BETWEEN INDIANAPOLIS, IND., AND JACKSONVILLE, FLA., ASKED FOR BY C. M. RIDGELY

The road between Martinsville and Roanoke is a rough, mountainous one. In fact, continuous stretches of first-class roads in the South are very scarce. Anyone contemplating a trip over southern roads should be well provided with block and tackle, and it would be well to have a car with a 60-inch tread. There are many toll-gates on this route and at each a toll of 15 cents is charged. The Blue Book states that it is necessary to register name, residence and license number with each gate keeper, and in order to facilitate matters suggests that 15 cents be placed in nineteen envelopes, the name, residence and license number appearing on the outside, and at each toll-gate hand the keeper an envelope.

From Roanoke to Winston-Salem you pass through Rocky Mount, Snydorville, Oak Level, Martinsville, Ridgeway, Stoneville, Madison, Ellisboro, Stokesboro, Kernersville and Centerville. You will have to ford many small streams, the first part being very hilly, with deep grades. The itinerary from Winston-Salem to Atlanta is as follows: Summerfield, Guilford Battle grounds, Greensboro, Jamestown, High Point, Thomasville, Lexington, Spencer, Salisbury, China Grove, Kanapolis, Concord, Newell, Charlotte, Sloane's Ferry, Belmont, Lowell, Gastonia, Bessemer City, King's Mountain, Grover, N. C., Blacksburg, S. C., Gafney, Converse, Spartanburg, Duncan, Greer, Greenville, Oak Grove, Piedmont, Anderson, Lavonia, Canon, Royston, Franklin, Commerce, Winder, Auburn, Lawrenceville, Snellville, Stone Mountain, Scottdale, Ingleside and Decatur.

BENSON'S $1 SIGNPOST

The Benson Automobile Club, of Benson, Minn., is being commended on its latest enterprise, the $1 guide post. The club started with twenty-five posts, and at the present time it has completed about fifty posts marking the roads in the townships of Six-Mile Grove, Marysland, Edison, Benson, Swenoda, Clontarf, Camp Lake and West Bank. Orders are on hand

BENSON CLUB'S $1 SIGNBOARD

for twenty-five more from Cashel, Torning, Herkhoven, Pillsbury and Hayes. These guide posts have been ordered by the township boards which pay $1 each for them, and they are erected in almost every instance at the points desired by the club. In this way the main roads are being marked at practically no expense to the club except the labor, which is done by the officers of the club, the work preliminary to putting on the names of the cities and villages and mileage being hired. Each township has ordered from four to twelve guide posts, and as every township is but six miles square, the territory is well covered.

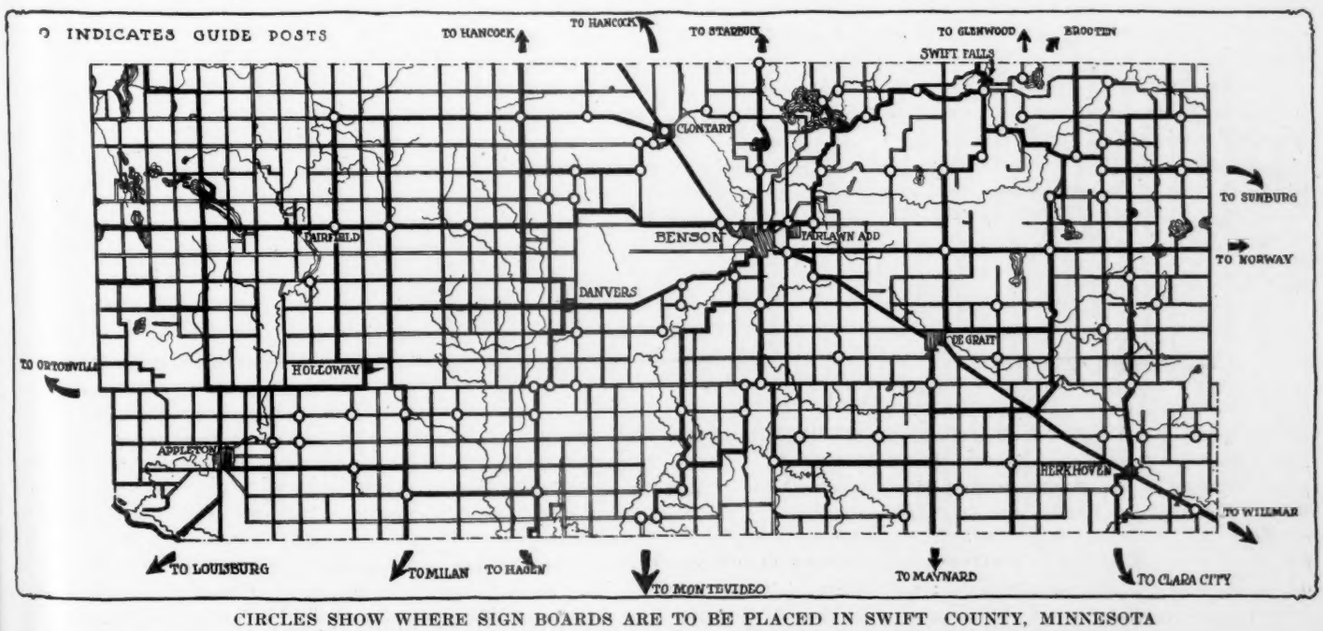
The guide posts will mark the roads leading to the cities of Appleton, Ortonville, Morris, Olivia, Glenwood, Montevideo and Willmar, and the villages of Danvers, Holloway, Hancock, Clontarf, Starbuck, DeGraff, Murdock, Kerkhoven and Terrace. The main traveled roads for tourists are along the railroad track east and west, and north and south from Benson to Glenwood on the north and Montevideo on the south.

The post is of cedar, 10 feet long with 4-inch top, painted in the lower 3 feet with three coats of creosote preservative paint; the upper 7 feet with two coats of highest grade white outdoor paint. The top sign board is 12 by 24 inches and the lower sign board 6 by 24 inches, both being made of 16-gauge galvanized iron. This is about the thickness of the lead in a lead pencil. They are each attached to the post by two ¼-inch bolts 4 inches long. The guide posts are painted first with a coat of red lead to prevent peeling, then with two coats of white outdoor paint. The letters are put on with stencils and are 2½ inches long. The cost of the material is as follows:

185 pounds 16 gauge galvanized iron, 25 pieces, 24 by 12 inches, and 25 pieces, 24 by 6	$ 8.33
25 cedar posts at 25 cents each	6.25
3 paint brushes	.65
1 quart creosote paint	.25
½ gallon white outdoor paint	1.20
100 bolts with washers	.75
15 stencils	1.00
½ pound red lead	.10
1 quart linseed oil	.30
Black paint	.40
	$19.23

WANTS TOUR COMPANIONS

George A. Baker, of Canon City, Colo., is planning a trip from his home to California early in April and would welcome any companion cars wishing to make the trip. He would prefer to be joined at Pueblo or Trinidad or any intermediate towns. The route followed will be that of the Trail to Sunset.



CIRCLES SHOW WHERE SIGN BOARDS ARE TO BE PLACED IN SWIFT COUNTY, MINNESOTA

The Realm of the

Fire Trucks Make Good in New England

Statistics Compiled from Seventeen Towns Show Reliability of Operation of Motor Vehicles

THAT motor-driven fire apparatus has solved the problem of fighting fires is now recognized by fire chiefs everywhere, but there are some who may yet be skeptical. They should not be if they will but investigate what has been achieved by motor fire apparatus. The best evidence of what has been accomplished and how efficient the service is may be gleaned from a report just compiled by C. A. Young, who has charge of the truck department of the A. P. Underhill Co. of Boston, that has the agency for the Knox cars. Mr. Young sent queries to the fire chiefs of twenty New England cities and towns where Knox machines are in use about the first of the new year and he got replies from seventeen of the places showing an astonishing record.

Satisfaction in Springfield

The apparatus in these seventeen places were called upon to respond to 3,253 alarms. Out of that number the cars failed to start in five instances and but in five cases did they fail to reach the fires. This is all the more remarkable when it is considered that in some instances the machines were handled by men inexperienced in motor truck operation.

Another remarkable fact that must be taken into consideration is that Mr. Young did not query the Springfield fire department, where the Knox machines are made, and where there are a number of Knox wagons in service, in an endeavor to make record figures, for thousands of alarms have been answered there since that city adopted the motor apparatus. Nor did he include the Boston Protective Department, that is now using its fourth piece of motor apparatus. Three of the cars of that department responded to 2,657 alarms, covering 8,566 miles, up to February 11, 1911, with very few delays, often beating out the Boston fire department apparatus drawn by horses, and getting busy before the regular firemen arrived. To get figures Mr. Young sent out a letter containing five questions. Here are the questions which he asked the towns; all but three replying:

1—On what date was your car placed in commission?
2—How many alarms to date in district covered by your car?
3—How many alarms answered by your car?
4—On how many alarms has your car failed to start? Kindly give reasons, if any, for such.
5—How many alarms did your car start to answer but failed to reach fire after starting? Reasons, if any, for such failures.

TABLE SHOWING WORK OF THE FIRE TRUCKS IN NEW ENGLAND

Town	Put in Commission	Calls	Alarms answered	Failed to start	Failed to reach fire
Boston	July 29, 1910	223	220	3	0
Haverhill	May 1, 1910	341	341	0	0
Newton	August 1, 1910	193	193	0	0
Lowell	April 2, 1910	915	915	0	1
Holyoke	October 20, 1910	278	278	0	0
Chicopee	June 3, 1908	183	157	0	2
Greenfield	August 15, 1911	12	10	0	0
Providence	May 25, 1911	90	89	1	0
Gloucester	November 3, 1911	15	15	0	1
Lynn	January 1, 1911	160	160	0	0
Attleboro	August 7, 1911	24	21	0	0
Manchester, N. H.	October 1, 1910	396	396	0	0
Arlington	March 18, 1911	69	67	1	1
Methuen	July 1, 1911	40	40	0	0
Belmont	September, 1910	45	45	0	0
Danvers	November, 1911	19	19	0	0
Malden	July, 1910	250	250	0	0
	Total	3253	3216	5	5

AKRON LANDS IDEAL PLANT

A new corporation to be known as the Ideal Commercial Car Co. will be organized in Akron, O., with an authorized capital of $200,000 to manufacture commercial cars of all kinds. The Ideal Commercial Car Co. has been doing business in Detroit for a number of years and some time ago a number of business men of Akron started a movement to have the factory removed to Akron. The plant of the Gilbo Machine Co. in East Akron has been leased. T. E. Greighton is president of the company. J. C. Sage is engineer.

WANT WHARFAGE RIGHTS

Committees from the Boston Automobile Dealers' Association and the Boston Commercial Vehicle Dealers' Association of Boston are planning to have a meeting to take up the question of allowing motor vehicles on the wharves in Boston. It is claimed that the Hub is the only large city in the country where trucks are excluded, except those using electricity. The steamship men and dock owners say they are willing to allow trucks on the wharf property if the board of fire underwriters will permit it. F. E. Cabot, secretary of the board, says that the starting of gasoline motors constitutes a fire menace.

"The provision we make is not arbitrary," he says. "We simply advise the owners of wharf property that if they allow gasoline cars in their sheds which leave 4 feet of smoke and fire behind them every time they enter or leave a shed we have to advance the insurance rate 5 per cent. To allow the motor vehicles on the New York wharves there has been a raise in the insurance rates, so Boston property owners may do the same if they wish it."

BAR HARBOR'S PREDICAMENT

Nantucket, the one place under the jurisdiction of Massachusetts where motor cars are prohibited, is awakening to the possibilities of motor vehicles and a committee from the little island off the coast was in Boston inspecting the fire apparatus at the show with a view to getting something of the sort. The question now arises, how will the town officials get around the law they passed by the

Commercial Car

Problems That Confront Coal Dealers

TABLE SHOWING CHARGES INFLUENCED BY SERVICE OR INACTIVITY

GENERAL AVERAGE OPERATING COSTS
ANNUAL

Machine Size	2-Ton	3½-Ton	5-Ton	6½-Ton
FIXED CHARGES				
Interest on investment @ 6% and depreciation on non-wearing parts @ 10%	$376.00	$458.00	$600.00	$709.00
MAINTENANCE				
Wearing parts	346.00	420.00	487.00	495.00
Tires	358.00	519.00	757.00	886.00
GARAGING				
Storage and washing (variable)				
Garage labor (variable)				
Insurance (variable) (Assumed)	720.00	720.00	720.00	720.00
OPERATION				
Gasolene @ 10 cents per gal.	250.00	300.00	375.00	500.00
Lubricating oil @ 35 cents per gal.	39.00	75.00	105.00	119.00
Operator (variable)				
Helper (variable)				
Licenses (variable) (Assumed)	1,040.00	1,040.00	1,040.00	1,040.00
	$3,129.00	$3,532.00	$4,084.00	$4,469.00

Based on performance of 50 miles per day per truck, 312 working days per year.

Total fixed charges, garaging and operator, 5-ton truck	$2,360.00
Total fixed charges, garaging and operator, 5-ton truck, per day	7.56
Total charges for maintenance, gasoline and oil, 5-ton truck.	1,724.00
Total charges for maintenance, gasoline and oil, 5-ton truck, per day	5.525
Total charges for maintenance, gasoline and oil, 5-ton truck, per mile	.11

legislature 2 years ago forbidding motor vehicles upon the island? At the time Frank J. Tyler of the Maxwell made a test case of the law and the courts upheld its constitutionality, and so even if the town buys a motor truck it cannot be used in the summer, as the exclusion law prohibits the operation of motor cars from June 15 to September 15. The rest of the time the island is cut off, sometimes for weeks, from the mainland by ice. The town has appropriated $5,900 for a motor fire wagon, but some of the livery men who would like to have motor buses say that if the wagon is brought there it cannot go into service in summer.

The island owns an engine, but at the last big fire there sparks from this started a far bigger fire than the original one and the old hand tub was worked overtime to put it out. Narrow streets also would handicap the truck.

W. P. Kennedy Points Out Delivery Is Question of Operating Trucks to Economic Limit

IN estimating the actual cost of coal delivery by motor truck William P. Kennedy, transportation expert for the Alco company, in his address March 14 before the Retail Coal Dealers' Association of New England, brought out many points which should be carefully studied by all truck dealers who have to make demonstrations to coal concerns. The facts that apply to New England apply to the central section of the country and also to the west. In them there is a common message to all.

In the preface to his remarks on costs Mr. Kennedy claims that the problem is not whether coal can be transported more cheaply by motor trucks than by horses, but whether the existing conditions regarding loading and unloading coal will permit of operating the machines at anything like their economic capacity. Coal yards are frequently without adequate loading arrangements. The ideal way to load motor trucks in the coal yard is through the overhead hopper system. If this is not possible spare bodies should be used, which can be hoisted vertically off the truck in the coal yard, and held suspended while being loaded and ready when loaded to be dropped in place on the truck.

One Objection Urged

Frequently one objection urged to motor trucks is that the coal has to be delivered in small quantities at half a dozen different places. This exigency can be coped with by a compartment body with side shoots from each compartment, so that employing one compartment at one residence does not interfere with other compartments to be emptied at other places.

One of the greatest impediments to the use of the motor truck in New England in the coal business is the inaccessible places for unloading, such as openings located in the walls of buildings 3 feet up from the sidewalk. In some cases it will require a chain bucket conveyor to meet the exigencies.

When it comes to estimating the cost of coal delivery, the truck demonstrator

will frequently find it very difficult to get reliable operation on the cost of delivery by horse equipment from coal companies, due principally to the various methods of bookkeeping used and the utter lack of any uniformity in cost per ton for this work. This is primarily due to the fact that there are two periods in the coal delivery year, the active period and the inactive one. The long summer season is a very inactive period, the fall and winter the active one. In estimating the cost portion of delivery the whole year must be taken into consideration, and the cost charged against the total tonnage per annum. Instead of this, it is frequently found that only the current charges for the daily operation of the horse vehicles when in active service are charged against the transportation for the current day, and this data alone is the one with which motor truck operation is compared. Again, we find the reverse condition, as where an installation may be active 26 weeks of the year, while the total cost of the year in bulk is divided by 300 to arrive at the cost per day and this cost per day used as the basis of determining the cost per ton delivered for any day of the 26 weeks. As a matter of fact, the annual cost in this instance should have been divided by 150 to determine the cost chargeable to each active day, and on this basis the cost per ton would be twice that of the former.

One of the Problems

The whole problem requires segregation of those charges which are constant whether the vehicle is employed or not, and an additional charge for those items affected by activity added to the first or fixed charge so as to arrive at a true cost of unit performance, whether this latter be based on a tonnage rating or on a ton-mile basis.

It is quite possible in determining the operating cost of machines to follow a similar practice of separating the inactive or constant charges from the active charges and the total charge per day thus arrived at should be used in the determination of the cost of delivery per ton or per ton mile.

To exemplify this the accompanying table may serve to show the charges influenced by service or inactivity. The items marked variable, however, are dependent upon each operator's particular condition, and to cover charges for garaging and for operators we have assumed a figure of $60 per month for garage and $20 for week for labor. This table with the total figures shown is intended to cover a year's operation and a performance of 50 miles per day per vehicle.

Table an Interesting One

In this table it will be observed that on each size truck there is a figure for fixed charges, which includes interest at 6 per cent and a depreciation of 10 per cent on those parts of the vehicle which are not subject to wear and which are replaced or renewed under the heading of maintenance. Under the maintenance charge there is a figure for the upkeep of mechanical wearing parts and another for tires, and in the operation division there are figures covering consumption of gasoline and lubricating oil, operators and other incidentals to the cost of service.

Assume that we are to determine the cost of operation of a 5-ton truck which is employed the entire year. The items for fixed charges, garaging and operators are constant and independent of the tonnage or mileage performance of the vehicle. This charge against the vehicle while inactive will amount to $7.56 per day, assuming 312 working days to the year, and the total of the maintenance items, together with the items for fuel and lubrication, can be resolved into a cost of 11 cents per mile since this example is intended to cover a 50-mile performance each day for 312 days.

Now, with the inactive charge of $7.56 per day and the charge of 11 cents per mile, by multiplying the latter by the mileage performance of the truck on any particular day and adding it to the inactive charge of $7.56 per day we get the total cost for transporting the day's tonnage and in this manner arrive at the actual cost per ton.

Assume that the truck covers 33 miles and delivers 31 tons. Thirty-three multiplied by 11 cents per mile equals $3.63, the active charge, and this added to $7.56, the inactive charge, makes the total cost of the day's performance $11.19, and since this day's performance is the delivery of 31 tons, we divide this figure by 31 and find that the cost per ton is 36 cents. In a similar manner any other performance can be calculated.

In the event of the machine being used only half of the year the fixed charge of $7.56 would be reduced by 50 per cent of the annual charge for operator and a reduction of the garaging charge during the 6 months to say $5 per month, thus making the fixed charge for the days the machine is rendering service $4.93 instead of $7.56, and consequently reducing the cost per ton in the particular case cited to 27 cents instead of 36 cents.

Segregation of Charges

It must be recognized that when the motor truck is not being used all other charges against it cease with the possible exception of storage; whereas, this is not so with horse equipment, as horses must be fed and cared for, almost independent of service rendered, so that if the motor truck were not used for 6 months of the year in the inactive period there might be considerable reduction and expense in that period over horse equipment.

It can be further borne in mind that if there is a long period of inactivity when the motor truck is not needed for coal transportation, it will be possible to rent out his truck for use in other service. This can be done at a profit, and if this profit is credited against the winter performance cost the inactive period in the coal business may be made a benefit, rather than a detriment to the motor truck.

New Agencies Recently Appointed in Commercial Field

Town	Agent	Make of Car
Albany, N. Y.	Troy Automobile Exchange	Lippard-Stewart
Ashtabula, O.	High-Level Auto Co	Gramm
Auburn, N. Y.	Edward A. Ross	Federal
Baltimore, Md.	Norwood Brothers	Lincoln
Baltimore, Md.	Oakland Motor Car Co	Federal
Bingh'pton, N. Y.	H. W. Brown	Alco
Boston, Mass.	Meyer Abrams & Co	Lauth Juergens
Bridgeport, Conn.	J. L. Carpenter	Federal
Buffalo, N. Y.	Sanderson & Burghardt	Federal
Canton, O.	Monnot & Sacher	Auglaize
Catskill, N. Y.	Amos Post	Gramm
Chattan'ga, Tenn.	J. D. Harvey	Federal
Chester, Pa.	Gallagher Brothers	Dart
Chicago	James Egan	Blair
Chicago	L. C. Long	Federal
Chicago	R. S. Mattoon Motor Car Co	Indiana
Chicago	R. W. Howie & Co	United States
Cincinnati, O.	Cincinnati Motor Truck Co	Federal
Columbus, O.	Adamson Automobile Co	Blair
Columbus, O.	Kimmel Brothers	Auglaize
Covington, O.	J. H. Hecker	Auglaize
Covington, Ky.	Kentucky Motor Car Co	Indiana
Dallas, Tex.	Levy-Kramer Automobile Co	Alco
Danbury, Conn.	Fillow Auto Co	Federal
Davenport, Ia.	Witt & Lembrecht	Grabowsky
Dayton, O.	Hosler Overland Sales Co	Dart
Decatur, Ill.	Augustus E. Staley	Alco
DeGraff, O.	Lockhart Brothers	Auglaize
Delphos, O.	Mueller Implement Co	Auglaize
Denver, Colo.	W. W. Barnett	Federal
Detroit, Mich.	Thompson Auto Co	Federal
Easton, Md.	P. E. Corkran	Dart
Elmira, N. Y.	Chemung Motor Co	Dart
Erie, Pa.	J. Burton Arbuckle	Gramm
Erie, Pa.	Park Auto Co	Alco
Everett, Wash.	Ferell Auto Co	Federal
Fort Wayne, Ind.	M. N. Plumadore	Federal
G'd Rapids, Mich.	Overland Motor Car Co	Federal
Harrisburg, Pa.	William J. Mehring	Alco
Hartford, Conn.	R. D. & C. O. Britton Co	Federal
Hillsboro, O.	James E. Roads	Gramm
Hoosick F'ls, N. Y.	J. E. Van Wert	Gramm
Jacksonville, Fla.	Claude Nolan	Federal
Jacksonville, Fla.	Guy R. Champlain	Alco
La Crosse, Wis.	La Crosse Plow Co	Dart
Larned, Kan.	W. S. Young	Federal
Los Angeles, Cal.	Standard Motor Car Co	Federal
Los Angeles, Cal.	U. S. Motor Car Co	United States
Lynn, Mass.	Charles E. Whittier	Federal
Manchester, N. H.	Manchester Auto Garage	Federal
Marion, O.	Hoyles & Moyer	Auglaize
Memphis, Tenn.	A. W. Whitaker Co	United States
Milwaukee, Wis.	Franklin Auto and Supply Co	Alco
Milwaukee, Wis.	Motor Service Co	United States

New York City Again in Motor Market

Bids Asked for by Fire Department for Thirty-One Pieces of Apparatus —Rush Work Demanded

PROPOSALS for supplying thirty-one pieces of motor apparatus to the fire department of New York were advertised for on March 22 by Fire Commissioner Johnson, the bids to be opened April 1. The apparatus to be bought constitutes the largest purchase of such apparatus made by New York, and probably by any city to date. It consists of the following:

Twenty-six combination chemical and hose wagons of the Scout type, 32 horsepower or more, with two 35-gallon tanks, 300 feet of 1-inch hose, and steel bodies to carry 1200 feet 2½-inch fire hose and full complement of men; delivery is wanted in 240 days.

Three high-pressure hose wagons, 45 horsepower or more, with steel bodies to carry 2100 feet of 3-inch hose and full complement of men and fire equipment; delivery in 120 days desired.

Two hose wagons without chemical attachments, 40 horsepower or more, with steel bodies to carry 1500 feet of 2½-inch hose and full complement of men and fire equipment; delivery in 120 days demanded.

All the foregoing must have four or six-cylinder engines of four-cycle type, water or air-cooled; have maximum speed of 30 miles per hour; be equipped with solid rubber tires guaranteed for 7,500 miles, and be guaranteed for 3 years under bond of 50 per cent of contract price.

These machines are intended for use in suburban districts and will be installed in the twenty-one new fire houses for construction of which contracts were awarded several months ago. The houses will be completed about the time the twenty-six scout wagons are ready for delivery. Plans for twenty-one other houses are now under way. The scout wagons will be the fastest pieces of apparatus in the department, as they will be required to show a speed of 35 miles an hour and climb the most difficult hills in the suburbs in the tests that will be made. When drawing the specifications for them, the commissioner and the apparatus board kept in mind the fact that many fires in the suburbs can be extinguished with chemical engines before the arrival of horse-drawn engines. The New York fire department now has six motor hose wagons, of which four are of the high-pressure type.

Owing to the fact that there was an interval of only 10 days between the advertisement for bids in the city record and the date set for opening the bids, and to the further fact that very little publicity was given to the proposed purchases, the new commercial vehicle committee of the National Association of Automobile Manufacturers issued a circular letter on March 23, calling the matter to the attention of all members of the association believed to be interested in fire department vehicles.

MOTORIZING PITTSBURGH

The first real step towards motorizing the entire fire and police forces of Pittsburgh has been taken. The director of the department of public safety has had prepared advertisements for bids on six combination chemical and hose trucks, five motor patrols, one tractor for a fire engine and two motor roadsters for the use of the superintendent and assistant superintendent of police. It is said that within 4 months the apparatus will have been secured and placed in use.

The step taken by the director is preliminary towards carrying out his idea to completely motorize both departments. Several motor fire trucks are at present in use in the city's engine houses and have given such complete satisfaction that more are wanted. The hilly streets of the city make this class of apparatus highly desirable. It is said that with motors in both branches of the city government an annual saving of $300,000 would result, $200,000 of this being in the fire department alone. As council has made appropriation for but half as much as is needed, it will be at least another year before the horse-drawn vehicles will have disappeared entirely.

It is said that the horseshoeing and feeding bills of the horses in one engine house alone are from $700 to $800 annually, while the cost of upkeep for the motor machinery would be but from $70 to $80 for the same time. The greater part of the old city can be covered by the five patrols of the motor variety. Later it is hoped that the entire city can be covered with these machines and the old-style vehicles done away with forever.

IN THE MARKET

The Sydenham hospital authorities of Baltimore, Md., have found it necessary to substitute the horse-drawn ambulance with motor power and are advertising for a chassis on which to place the present hospital ambulance body. The hospital is under the supervision of the health department of Baltimore.

At the last town meeting of Framingham, Mass., voters it was decided to appropriate $5,000 for the purchase of a motor fire wagon for the central fire house.

The city council of Meadville, Pa., has passed a resolution calling for the purchase of a motor fire engine and a motor hose wagon. The wagon will be of not less than 60 horsepower and will be used in the hilly districts of the town. It will cost from $6,000 to $7,000. There is much valuable property in the hilly district and the councilmen believed that a motor wagon would be of much greater service than the horse-drawn vehicles.

The city of Benson, Neb., has purchased a fire truck and plans to equip the fire department entirely with motor apparatus in place of the old horse-drawn equipment.

A motor truck will be purchased by the Marion county commissioners, Indianapolis, for the use of the county bridge carpenters who are required to travel continually over the county. The county council has made an appropriation of $1,000 for the truck. The present horse-drawn equipment used by the carpenters will be disposed of.

As a result of two big fires that burned the town hall and a church, the residents of Braintree, Mass., got busy at the last town meeting and after a bitter fight passed a resolution appropriating money to purchase a motor-driven fire wagon. The selectmen are now looking for bids for the vehicle.

Fire Commissioner Willard Estabrook of the Brookline, Mass., fire department in his annual report has urged the selectmen to purchase additional motor apparatus for the department. The town now has two motor vehicles in its fire equipment and they have given splendid service.

MUNICIPAL GARAGE FOR BOSTON

Commissioner Louis K. Rourke of the Boston public works department has had plans drawn for a municipal garage that he wants to have erected in the Albany street yards connected with his department at a cost of $55,000. In his department alone there are twenty-two motor cars. The plans provide for a concrete structure large enough to house fifty cars. By having a municipal garage he expects to save money for upkeep and also prevent the tendency to joy-riding, as a record could be kept of every machine. A larger garage may be built to house all the city cars except those used by the fire department, the police and Mayor Fitzgerald.

BOSTON BUYS NEW TRUCK

The Boston fire department has accepted a motor ladder truck after giving it a tryout in climbing Parker hill, one of the steepest grades in the city, where there is a lot of valuable property whose owners have been demanding better fire protection for several years. The big truck made the climb up the hill in 2 minutes 53 seconds. The best that horse-drawn apparatus could do was from 6 to 10 minutes and some of the apparatus could not get up there at all some days.

EAGLE BUILDING TRACTORS

The Eagle Mfg. Co., of Appleton, Wis., gasoline engines, tractors, etc., has just completed two models of a large gasoline tractor propelled by a four-cylinder, 60-75-horsepower engine using either gasoline or kerosene as fuel. Twenty-five tractors of this type will be marketed during the present season.

The Readers'

W. G. M. Takes Part in Weight Controversy and Declares for Car Neither Too Heavy Nor Too Light—Marine Glue Recommended for Sealing Batteries—How Angle of Steering Knuckles Is Determined

Medium-Weight Advocate

Illinois Correspondent Declares He Is Not Extremist In Controversy

WILLIAMSVILLE, Ill.—Editor Motor Age—There has been considerable discussion in regard to the relative merits of the light and heavy cars. I noticed that nearly all of the writers go to extremes; that is, one is talking about an extremely heavy car, while the other is talking about an unusually light car. Now I intend to tell you what success I have had with a medium-weight car.

The car that I am now driving is a five-passenger touring car of 40 horsepower and weighs 2,580 pounds fully equipped, ready for the road. I have driven this car over 14,000 miles of country roads, miles of which were muddy or rough. We also have used it to pull farm wagons, wheat drills and disabled cars time and again, and yet have to have our first mechanical breakdown except what were caused by running into wagons, ditches and the like and then the worst we suffered were bent fenders and radiators.

While I am not condemning the heavy or light cars, as I believe they both have their uses, I think a medium-weight car of, say, 2,500 pounds, with a 35 to 40-horsepower engine, will be found to have sufficient power and will be sufficiently strong to withstand any uses which may be reasonably expected of it, without being so extremely hard to steer and without being so hard on tires, as I see some say the light and heavy cars are. While our car will not uproot trees, tear down fences or hurdle ditches as our friend from Dixie, Wash., says his car will, we wish to assure him that we can open the doors without using a crowbar, as he hints is necessary with a light car, and that we can run our car as many times around a dollar as most others, and that we get a fair mileage out of our tires.—W. G. M.

PREVENTING BATTERY LEAKAGE

Fort D. A. Russell, Wyo.—Editor Motor Age—I desire a formula of the material used for filling in around and over the top of storage battery cells to seal them in and prevent leakage. I have been unable to find such a formula in any work at hand.—G. A. S.

The sealing waxes used by the different battery manufacturers, are made according to a number of formulæ, many of which are a secret of the concern; however, you should be able to get a very satisfactory substance for this purpose from almost any wax-supply house, like Frank C. Clark, 124 West Kinzie street, Chicago; or you should get satisfactory service from the use of marine glue. Marine glue is prepared by dissolving one part of India rubber in crude benzine, and mixing with two parts of shellac, by the aid of heat. The waterproof character of this cement, in connection with its slight elastic flexibility, the ease with which it is applied when warm, and the promptness with which it sets, on cooling, make it a most useful substance.

DETERMINING STEERING ANGLE

Princeon, Ill.—Editor Motor Age—Please explain the method of determining the angle of the steering knuckles.—T. W. Winbolt.

It is necessary to make such arrangements that will enable the front wheels respectively to roll on different orbits, not to a common radius, but from a common axis. The angle of the arms is determined by laying out the running gear

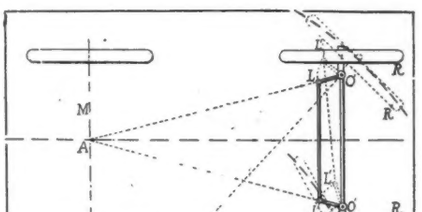


FIG. 1—TO OBTAIN STEERING-ARM ANGLE

diagrammatically, and the diagram is called the Ackerman-Jeantaud system.

The Ackerman-Jeantaud system of steering is illustrated in Fig. 1. In this the O L and O′ L′ connected by the tie-rod L L′ converge to the rear, and are parallel with and cut by the line A L O on the left side and A L′ O′ on the right side. The point A is at the center of the rear axle. In turning, the point A moves out on the rear axle plane to the point A1, with the result that the turning radius of the car becomes that of the radius A1 O′ for the inner wheel, and the radius of turning of the outer wheel becomes A1 O, so that the two canting wheels turn on parallel orbits around a common axis, A1. Obviously, the arms L O and L′ O′, instead of converging to the rear, would serve just as well if there were made to diverge to the front, provided only they be designed to remain in the same plane as a projection of the line AO for LO and AO′ for L′O′. This is not always possible in practice.

Carbureter Is Thirsty?

A. Schwartz Advances Theory as to Winton Troubles in Starting

MUNCIE, Ind.—Editor Motor Age—In the Readers' Clearing House, issue of February 29, I took special notice of the Victoria, B. C., question. I think I can give the operator of that Winton Six better information regarding his troubles of starting the motor after it has been standg. I am running a Winton myself. The car bureter of this engine gets dry, too, now and then, even in warm weather. It is not bad adjustment or frost that causes the engine to stop, because B. C. says in his question, "after the motor has been running a while." The first few times it happened to me that the carbureter got dry, I repeatedly filled the auxiliary tank with gas, keeping the motor running this way, until the pressure in the rear tank was high enough to force the fuel to the auxiliary tank. I would advise B. C. to keep all the air pipes leading from the pump to the main tank in good condition, also look after the packing under the tank cap. To stop the gasoline from flowing, I reground the small valve in the auxiliary tank and lowered the float. As B. C. had the device apart, he will know that it is much like a carbureter. A float, connected with the valve through a rocker arm, will hold the valve firmly to its seat as the gasoline level rises, and prevent the flow of more gasoline than necessary. I am pretty sure that this will help.—A. Schwarz.

SHORT-CIRCUIT THE TROUBLE

Rolfe, Iowa.—Editor Motor Age—In answer to the letter from S. J. Vann of Jackson, Ala., regarding the trouble with his E-M-F, the following may be of help to him. Some time ago I had an E-M-F car come into my garage with the same trouble. If one were to stand on the running board the engine would stop, whether running on the magneto or the batteries. Running on rough or sidling roads would make the engine miss or stop. I found that the insulation on the wires running from the batteries to the coil was worn off and the tilting of the car, or the jolting over rough roads caused the wire to contact with the frame.—F. M. Ritchey.

Clearing House

More Chapters Added to Discussion—Illinois Man Point Out Light Car Saves Repair Bills and Wyoming Motorist Offers Figures in His Argument—Overcoming Some of Difficulties of Self-Starting

His Views on Light Cars

M. Williams Finds Repair Bill Small and an Economy in Tires

GREENVIEW, Ill.—Editor Motor Age—I am the owner of a light car and think it is the coming car. A light car will go twice and sometimes three times as far on a set of tires as a heavy car. I got almost 4,000 miles out of two cheap tires, unguaranteed at that, and have one tire which has gone almost 10,000 miles. We have some of the gumbo roads such as Subscriber from Iowa mentions.

I think I am safe in saying that the repairs on these light cars are from one-third to one-half cheaper than on the heavy cars. If Subscriber from Iowa recalls, there appeared in Motor Age, in an article regarding the race from coast to coast, a record of one of the light cars, a Ford, which gave a mileage of over 10,000 miles over the same roads in front of the other cars, getting the full benefit of the rough roads. I thought at the time that if any greater mileage was gotten from the other cars they certainly would have told it. I think Mr. Farmer, of Pratt, Kan., has had enough experience to know the difference in the two cars, when it comes to tires or repairs.

I believe that Subscriber from Jewell, Iowa, is mistaken about the nut bolts and screws getting loose on the light cars. There is scarcely a factory but key its nuts on the bolts or lock them on with a lock washer, and I'll say I couldn't allow a driver like him to drive one of my cars 5,000 miles and not look at the valves. Two-thirds of the used cars for sale today are of the heavy type.—M. Williams.

MAKING THE ENGINE START

Agricultural College, N. D.—Editor Motor Age—In a recent demonstration of a well-known six-cylinder 1912 car, equipped with an acetylene starter, it was noted that the engine would start only about 50 percent of the time. This car was equipped with a non-vibrating coil ignition system. An investigation to find the cause of the trouble showed that the engine usually stopped in such a position that a spark could not be formed in any of the cylinders by pressing the button on the coil box, or by rocking the spark control lever, because of the contact breaker being out of contact.

To remedy this condition, a wire was attached to the insulated binding-post on the magneto contact-breaker box and run through an auxiliary push-button attached to the dash, and thence to the frame of the engine, as shown in Fig. 2. With this arrangement a spark could be produced at any time, excepting a very small percentage of the time when the contact-breaker was in contact. In the latter case, the spark could be formed by the coil button being pressed. As soon as this method was applied, the engine could be started at least 90 per cent of the time.—R. A. C.

This is a very good idea and in view of

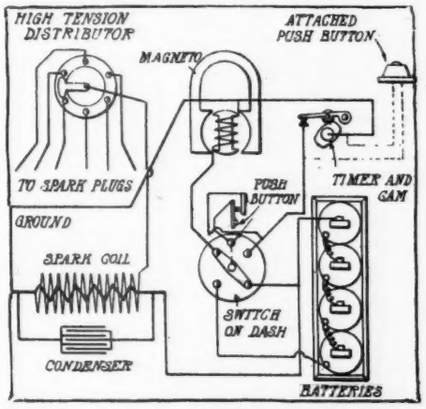


FIG. 2—AID TO ACETYLENE STARTERS

the results, the change was well worth the trouble. Motorists are quite apt to blame the self-starter when the fault is with other portions of the power plant. For instance, during the recent cold spell, one of the men in the Chicago agency of a car fitting an acetylene self-starter was snowbound in a western town and naturally the first visit was paid to the local agent of the car he represents. The local agent immediately informed him that the starter on one or two of the cars had suddenly gone out of commission for no apparent reason. The first trial of the starter turned the motor over, but it refused to run. The Chicagoan closed the air inlet, started the motor and it continued to run without difficulty. It merely meant that the carbureter, which had been correctly adjusted for mild weather, supplied too poor a mixture in the extreme cold snap. Yet the starter was blamed.

Has Figures to Prove It

Wyoming Motorist Cites Arguments Why He Favors Light Car

BUFFALO, Wyo.—Editor Motor Age—I have read with much interest the controversy over the relative merits of the light and heavy types of cars and beg leave to add the testimony of my experience to what already has been said by the parties to this controversy.

Buffalo, Wyo., is an inland city of about 2,000 population, nestled close up against the Big Horn mountains. Our nearest railroad point is 35 miles distant, hence most of the passenger travel is by auto. Owing to the sparsely settled condition of the country there is not money enough to build roads to any serious extent, so I might say that travel by motor car in this territory does not grow monotonous, to say the least.

Two years ago I engaged in the motor livery business by buying a second-hand Ford car, spent a little over $100 repairing it, including a new rear axle of the latest pattern, making the car cost me about $850. Tires already had been run 3,000 miles. I drove this car in the hardest kind of going much of the time and often heavily overloaded—seven and eight people sometimes with baggage—for just 1 year, including the winter season when few other cars ventured out. During this year I traveled about 14,000 miles.

As near as I can recall to memory my repair expense during this year amounted to about $150 and $80 for four new tires. I averaged 16 miles per gallon on gasoline, but used more lubricating oil than would have been necessary on account of a leaking crankcase. With gasoline at 30 cents and oil at 85 cents, this is quite an item in our running expense here. To the best of my knowledge and belief, then, judged and figured from incomplete records and memory, my total running expense for the year was very close to $685.

At the end of the year I sold the car for $400, which left $450 more to charge up as expense, since it represented depreciation in the value of the car, making a grand total of $1,135 as the cost of running the car that year.

Becoming more ambitious and competition growing stronger, I bought a heavy 3,300-pound car at a cost of $2,000, just 1 year ago this month. I have kept a very complete record of expense on this car and will give the results:

The mileage traveled for the year for the heavy car totals 11,313 miles and the expense totals $1,314.35, not considering depreciation in value of the car. I will divide the different classes of expense as follows: Repairs, including labor which aggregates three-fourths of total, $132.27; tire expense, $417.65—$60.65 of which is for new tubes and for

vulcanizing, etc.—gasoline, oil, grease and incidentals, $764.43.

With this car I can get about 9 miles on a gallon of gasoline. It must be remembered that the altitude here is high—from 3,500 to 5,000—and we cannot get the mileage out of gasoline here that they do in lower altitudes..

This car has given me excellent service and has only once been disabled on the road—a broken knuckle—in the 11,313 miles of travel over extraordinarily difficult roads, and in spite of the hard work it has done the car is today in excellent condition. Now, the question is, How much has the car depreciated in value? I am satisfied I could not sell the car for more than half what it cost, so it seems to me that it would be fair to assume that the car has depreciated $800 in value. Add $800 to the total running expense of $1,314.35 and we have a grand total of $2,114.35, which represents the cost of running this car in the rent service here for 1 year.

It is very true that the heavy car gives more pleasure and comfort to the occupants and especially to the driver when you are traveling over roads that hold them up, but give me the light powerful little car when you are out on the wide expanses of Wyoming, 20 miles from nowhere, stuck in a dry, sandy creek bed up to the axles, or down in a gulch with a 50 per cent grade and loose rock on your way out, then is the time you will appreciate the advantage of being able, with the help of the passengers, to boost it out and be on your way, when with the heavy car in this condition you would have many hours to ponder over the situation while waiting for the chance passerby with a freight outfit to pull you out, paying any amount up to $10.

I believe the man who wants simply transportation with comfort, over roads that are good, bad and indifferent, at the least cost, in motor travel, should get a reliable make of light car.

Furthermore, it seems to me that there is something wrong with the reasoning of a man who believes he can haul 3,300 pounds around the country as cheaply as he can 1,700 pounds.—Charles C. Diers.

Reviews Carbureter Adjustment Era

S. D. Hirschl Tells of Efforts of Manufacturers and Favors a Device on Steering Column—In Addition to Automatic Device Driver Should Have One Controlled by Hand As Well

CHICAGO—Editor Motor Age—It is interesting to note how history repeats itself—or perhaps more properly, how it sometimes wanders around a while before finding which way to turn. In the old days of the original Longuemare carbureter, before the modification of Krebs, it was necessary to adjust the mixture from time to time to conform to different speeds and throttle openings and other driving conditions, and it was not uncommon to find the carbureter control devices arranged on the steering column and within easy reach of the driver. Then came the auxiliary air inlet, which was looked upon as the panacea for all carbureter troubles, the adjusting devices were removed from the steering column and other accessible places, and nearly everyone suffered with a more or less aggravated case of the "factory-adjusted" carbureter—the particular aggravation lying in the fact that in order to properly readjust such a carbureter, after a factory bungle or after the disturbing influence of time and use, it was necessary to crawl under the machine and work at the carbureter while the motor was running. Next came the hand-controlled additional air inlets, some of them home-made and others supplied by dealers as accessories; and most of them only half right, for they admit the additional air above the throttle, instead of below it, making it necessary to vary the adjustment with different throttle openings.

And finally the car manufacturers, who leave all the experimenting to be done by the purchasers, and are always the last ones to recognize a necessity or attempt to meet it, are providing their carbureters with additional air inlets and other mixture adjusting means adjustable from the driver's position; and the hand-control devices are coming back—the word being used geographically as well as chronologically, as most of them thus far have gotten back only as far as the dash, where they are within the driver's view, if not always within his reach. Back a little farther would place them on the steering column where they belong; and there is a promise of a really satisfactory arrangement at last, viz., automatic devices for roughly adapting the adjustment of the carbureter to the varying conditions of work to give an approximately correct mixture at all times, and in addition, a hand-controlled device within ready reach of the driver's position for supplementing and correcting the work of the automatic devices whenever necessary or desirable.—S. D. Hirschl.

There is much truth in the above communication, but it might be said in defense of the manufacturers that the force of fashion is much to blame.

COMPRESSED AIR GREASE GUN

Aledo, Ill.—Editor Motor Age—I herewith enclose a sketch of a grease gun we have had in use for over a year and find it very satisfactory and thought perhaps some of the readers of Motor Age would be interested in it. It is operated by admitting compressed air through connection A to the top of the piston, driving it down, B acting as a packing gland. To fill the gun, screw out the cylinder head C and pull back the piston with handle D, at the same time filling the cylinder with grease, thus insuring its being thoroughly packed. It is advisable to have several sizes of nozzles E. We find it especially valuable in filling planetary transmissions where it is necessary to force heavy grease through a small hole, as it takes only an instant to discharge.—Frank Townsley.

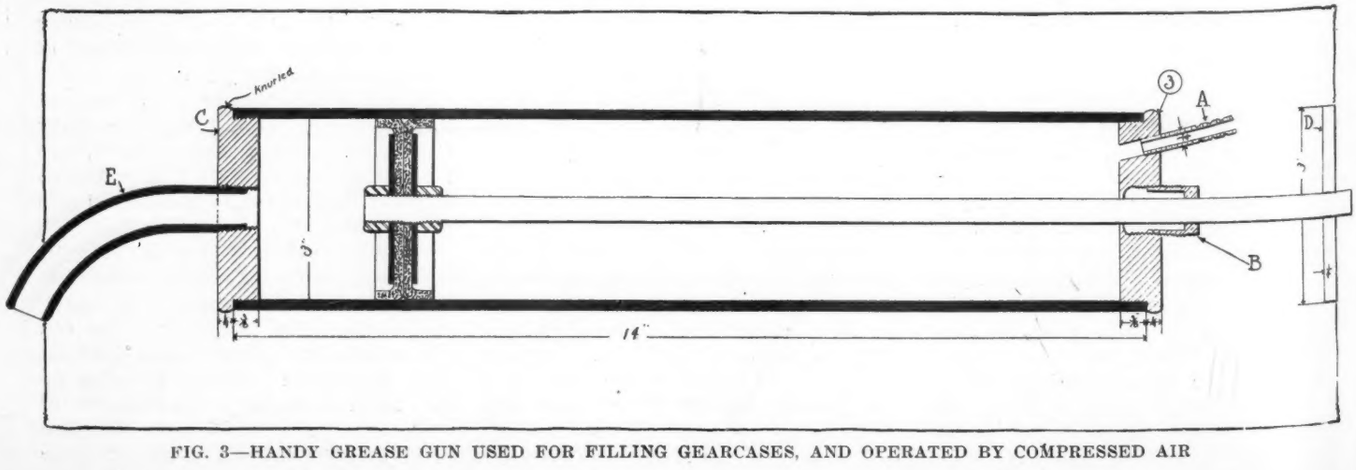


FIG. 3—HANDY GREASE GUN USED FOR FILLING GEARCASES, AND OPERATED BY COMPRESSED AIR

Spokane Man Defender of Heavy Car

Comfort and Serviceability Two Paramount Features That Public Demands Is Claim Made by a Reader—Distinction Between Irreversible, Semi-Irreversible and Reversible Steering Gears Explained

SPOKANE, Wash.—Editor Motor Age—I have noticed lately in the columns of the Readers' Clearing House considerable discussion taking place relative to the light and heavy car question, and wish to make a few remarks on a communication from A. D. Carpenter which appeared in Motor Age of March 7. Mr. Carpenter introduces himself in his stand for the light car by stating the first car he purchased "was the heaviest one he could find outside of a truck." He next complains that his tire expense for a year "with the heaviest car he could find" was $70. Anyone who has owned or driven one of these "heaviest cars" for a corresponding length of time will readily agree that his tire expense was extremely reasonable, for $70 will scarcely purchase more than a single complete tire for any of the large heavy cars on the market today.

He next says the light car is the coming machine. If by this he means that in the near future there will no longer be a market for the heavy high-grade car, except among the ultra wealthy, he should make himself aware of the fact that popular opinion, as reflected in the late announcements of the various manufacturers, evidences a most decided trend toward greater weight and power. The most prominent manufacturers of the medium-priced stock have announced for 1912 new models of increased weight and power which, selling at practically the same price as the older and lighter models, will quickly replace the latter in popular favor. In the high-priced class, larger and more powerful machines are obtainable today than ever before.

I am sure Mr. Carpenter would not be so firm in his opinion that "the light car can stop and start quicker and is easier to handle than the large heavy car," should he ever have the pleasure of piloting some of the new 1912 sixes through a crowded street or over a country road.

Mr. Carpenter states "tires wear out three or four times quicker on the heavy car," which leads us to conclude that his experience has been limited to a heavy car that lacked sufficient tire equipment. He states further that "the gearing must of necessity wear out in like ratio as the tires." Aside from the general prejudice the gentleman appears to bear against the heavy car, the grounds upon which he bases this statement are not very apparent.

Comfort and serviceability are two paramount features that the public demands of the modern motor car, and which cannot be obtained in any other than in a car of sufficient and reasonable weight. However, it may be said that extreme light weight spells discomfort and inability to give regular service no more surely than does excessive weight, and it is this excessive, or rather unnecessary, weight which the manufacturer is ever on the guard against.

To the farmer who is at present separated from the city by rough muddy roads, any extremely light vehicle may at present prove desirable, but the good roads movement now sweeping the country will be one of the most potent factors in keeping open a market for the reasonably large and comfortable car.—A Reader.

AS TO STEERING GEARS

Dallas City, Ill.—Editor Motor Age—Please advise me relative to the most suitable style of steering gear for a car weighing about 3,400 pounds, to be used mostly on soft dirt roads such as are usually found in the country.

1—What is the meaning or distinction of irreversible, semi-irreversible and reversible steering gears?

2—Which style takes up the least room between the frame and motor base? This is a very important point, as the frame on my car is very narrow.—F. W. Burg.

1—Keeping in mind the common type of car which is steered by the front road wheels, an irreversible steering gear is one whose design is such that the road wheels can be turned in any desired direction by operating the steering wheel, but the steering wheel cannot be turned by actuation of the road wheels. A semi-irreversible steering gear is a design in which it is possible to move the steering wheel by turning the road wheels, but so much effort would be required as to make the operation difficult. A semi-reversible steering gear, therefore, is a reversible one, though it exhibits a strong tendency toward irreversibility. A reversible steering gear might be said to be one in which it is possible to move or operate the steering wheel by turning the front road wheels on their vertical axes.

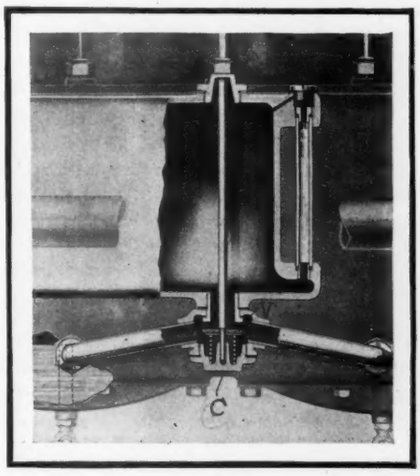


FIG. 4—FLANDERS VACUUM OILER

It is desirable to have the steering gear of a motor car as nearly irreversible as possible, for otherwise should the road wheels strike a stone or get into a rut in the road, which would tend to deflect them, the motion would be transmitted back through the steering mechanism to the steering wheel, causing it to revolve. This reversing of the action is very annoying and dangerous, as the driver always must have a very tight grip on the wheel so as to prevent this deflection, which might easily cause disaster.

2—Most manufacturers of steering mechanisms now make a style of gear sufficiently narrow to be applicable to practically all standard motor car designs. A number of the standard makes of steering mechanisms were illustrated and described in the January 25 issue of Motor Age, pages 84 and 85.

USING TOO MUCH OIL

Cold Spring, N. Y.—Editor Motor Age—I am driving a 1911 Flanders 20. It is a new car just from the factory. I cannot get more than 10 miles out of 1 quart of oil, no matter what height the adjusting nut on the other may be. If the nut is well screwed down or left off altogether, it is the same. I am sure this amount is excessive.—W. C. Haight.

Your trouble is a very unusual and unless you motor smokes considerably, it may be due to a leak in the crankcase or reservoir. If you will examine the under portion of your motor carefully you, no doubt, will be able to find out where the leak is, if there be a leak. As there is no adjusting nut used in connection with the vacuum oiling system of the Flanders 20, it is quite possible that you have mistaken the nut or spring retainer cap C, Fig. 4 for this purpose. If this is the case, perhaps you have lost the valve V. It may be that oil is leaking from the gauge connections or from the pipes communicating between the reservoir and crankcase.

SUGGESTS DIFFERENT CARBURETER

McLeansboro, Ill.—Editor Motor Age—In reply to the letter of A. G. Hansen, of Neligh, Neb., in the issue of February 29, will say that I had the same trouble with the same type of car, a model 19 Buick. The car was equipped with a model D Schebler carbureter and if I attempted to throttle the motor down to low speed, it would miss fire and stop. After fitting a model L Schebler carbureter the trouble was entirely eliminated. I was given a good allowance on my old carbureter by the Schebler company. I hope my experience will be of assistance to others.—Cyril C. Hassett.

Fitting Rod Bearings

Bronze Bushings Cannot be Fitted as Tightly as Babbit Without Seizing

LOVINGTON, Ill.—Editor Motor Age—Will Motor Age answer the following questions through the Readers' Clearing House?

1—How much play should a connecting rod bearing have?

2—Was the Marmon Wasp, with which Ray Harroun won the 500-mile race at Indianapolis, a four or six-cylinder car?

3—Would a gasoline mixer such as the Gyrex be practical?—A Reader.

1—A connecting rod bearing should have no more play than is necessary to allow it to run freely. The lateral or side play varies in different motors, and this too should be no more than is required to permit the crankshaft to turn freely when all rods and pistons and cylinders are assembled. When scraping in a set of connecting rod bearings it is customary to make the babbitt or white metal bearings so tight that the motor is cranked with difficulty and then run with plenty of oil until the motor can be cranked freely; but a bronze bearing must be fitted as closely as possible without any apparent binding; in short, the rod must be free enough to swing on its pin by the force of its own weight. A bronze bearing if too tightly fitted will heat up and sieze very much quicker than a white metal bearing.

2—The Marmon Wasp mentioned was a six-cylinder car.

3—It is reported as being both practical and beneficial, though Motor Age has no data regarding official tests of it.

SMALL VULCANIZERS SATISFACTORY

Frankfort, Ky.—Editor Motor Age—Please answer through the Readers' Clearing House the following:

1—What is the horsepower of a Stoddard-20, 1911 model?

2—Are small vulcanizers in the hands of car owners satisfactory for repairing cuts in casings?—Nevil M. Garrett.

1—The 1911 Stoddard 20 was rated at 25.6 horsepower according to the A. L. A. M. formula.

2—Small vulcanizers in the hands of car owners are satisfactory for repairing cuts in casing and for vulcanizing patches on tubes if the man doing the work is very careful and follows exactly the directions given by the maker of the vulcanizing outfit. Trouble is experienced with some of these small outfits but in practically every case it is due to the carelessness of the operator.

WATER IN THE GASOLINE

Chanute, Kan.—Editor Motor Age—Please answer through the columns of the Readers' Clearing House the following questions:

1—How can one tell there is water in gasoline?

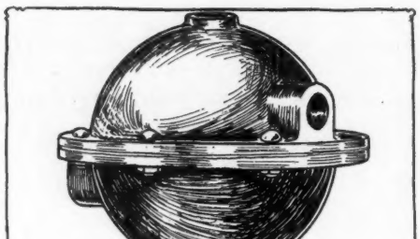


FIG. 5—A SIMPLE GASOLINE FILTER

2—What effect would the using of gasoline containing a portion of water have on an engine. Would it be injurious to the engine?

3—What is a practical method for separating the two?—R. M.

1—With the ordinary proportions of water in gasoline it is impossible to tell its presence by any means except a laboratory test or pouring through chamois skin.

2—Water in the gasoline causes intermittent missing of the motor.

3—Strain the fuel through chamois skin. Water is heavier than gasoline and settles to the bottom of the tank or other receptacle. Consequently if its presence is suspected, drain a little out of the tank and carbureter after the car has been standing for some length of time.

SUGGESTS FILTER FOR TRACTOR

Gower, Mo.—Editor Motor Age—I have read in the Readers' Clearing House, of a person wishing information regarding a filter for a motor on a plow. I have invented a device which I call an eliminator, that eliminates water, sediment and foreign matter as the motor uses the gasoline. Fig. 5 shows that the gasoline is taken in from the lower side of the filter. It is forced up through a chamois skin filter, furnishing the motor with pure gasoline and leaving the water and sediment in the trap to be drained off at the will of the operator. I owned a passenger car and had engine trouble; that's how I came to study out this device.—F. L. Ogden.

STORING A BATTERY

Findlay, O.—Editor Motor Age—I have a three-cell Exide storage battery which is used for ignition purposes and which has developed a slight leak. Not desiring to go to the expense of having it repaired, I would like to know how to proceed to put it in shape to be laid away indefinitely.—E. C. Miller.

Have the storage battery fully charged, then pour out the electrolyte, refill with distilled water, and place the battery in circuit with an electric lamp, a water rheostat or some other suitable resistance and discharge at 3.5 amperes. The water then can be emptied from the cells and the cells allowed to stand open until dry.

Has Carbureter Trouble

Holly Device on Ford Car Difficult to Adjust—Remedy Suggested

MT. MORRIS, Ill.—Editor Motor Age—I have a 1912 Ford with the new Holly carbureter. When running on high speed at 20 or 25 miles an hour it runs well but if I throttle it down to 10 or 15 miles an hour it will begin to miss fire, run very sluggish, and finally spit in the carbureter. Then it begins to run very nicely again but, at slow or high speed, the spitting in the carbureter continues. I have adjusted the carbureter in many different ways but have not corrected the trouble.

2—What is the gear ratio of model T Ford, also the Buick.

3—What is the horsepower of the Ford model T; Buick 30-40-16; Overland 30-40; and Velie 40, by S. A. E. rating?—L. B.

1—Your trouble probably is due to an air leak between the carbureter and the cylinders of the motor. An air leak would spoil the mixture sufficiently to prevent the motor from firing regularly at low speeds. It is possible that there is no gasket in the upper joint of the carbureter, or perhaps, it is defective.

All connections between the carbureter and cylinders should be tested by wrapping a cloth saturated with gasoline around them while the motor is running and misfiring. In this way, if a leaky joint is covered by the saturated cloth, gasoline vapor instead of pure air will be drawn in, or the air at least excluded, and the engine will begin to run regularly, without misfiring. The operation of the motor should be carefully noted while making the test so that any change will be immediately detected. If this advice does not help you, and you are sure that the fault is not due to poor adjustment of the ignition coils, Motor Age would advise that you consult the Chicago agency of the Ford company.

Motor Age would advise another attempt and suggests that as your trouble is due either to too much air or insufficient gasoline, the trouble might be caused by: Faulty adjustment of air valve; air valve stuck; weak or broken air valve spring; leaks in inlet pipe or connections; or faulty adjustment of gasoline valve; faulty adjustment of float; water in gasoline; dirt in passages.

2—The gear ratio of the model T Ford is 3 7-11 to 1; and the Buick 3½ to 1.

3—According to the S. A. E. formula, the Ford model T with 3¾-inch bore is rated at 22.5 horsepower; the Buick 34 and 35, with 3¾-inch bore, 22.5 horsepower, and models 28 and 29 with 4-inch bore, 25.6 horsepower, model 43 with 4½-inch bore 32.4 horsepower; Overland 58 with 3¾-inch bore, 22.5 horsepower; model 59 with 4-inch bore, 25.6 horsepower; and Velie with 4½-inch bore 32.4 horsepower.

Unusual Carbon Deposits

Too Much Oil in Two Middle Cylinders—Buick Oiling System Described

MT. PULASKI, Ill.—Editor Motor Age—I have a model 17 Buick, and would like to know why the two front cylinder get more carbon than the two rear ones.

2—I also would like to have the oiling system explained.

3—How often should oil be changed?

4—Is it necessary to change the oil in the transmission and differentials? If so, how often should this be done?

5—Which is the better, light or heavy hard oil for this purpose?—A. M. Park.

1—Your trouble is claimed to be very unusual, and may be due to broken or ill-fitting piston rings that permit an excess of oil to accumulate above the piston. If the piston rings do not fit properly, the compression in the cylinders mentioned also will be poorer than in the cylinders in which the carbon accumulations are not so great. The remedy for piston ring trouble generally is the proper fitting of new rings. It also is possible, however, that the rings themselves are dirty and stuck in their grooves. Put a tablespoonful of kerosene in cylinders over night.

2—The oiling system of the model 17 Buick is a circulating splash type, in which oil contained in a reservoir at the bottom of the crankcase, is drawn out by a gear pump and forced into the splash basins above the reservoir. The connecting rods dip into the oil contained in the splash basins and splash it into the cylinders and onto all internal mechanisms. A regular mist of oil is maintained in the interior of the motor when in operation. The oil that collects on the inner walls and overflows from the splash basins, returns to the reservoir below to be strained and recirculated. Perhaps much of your trouble is due to an excessive amount of oil in the motor. From 4 to 6 quarts generally is the amount to be maintained in the reservoir; a pet cock is provided on the side of the reservoir to show when the proper level is reached. Should this be stopped up a wire may be used to clear the passage through it.

3—The motor oil should be changed every 2 months if the car is in daily use, and even oftener if the service required of it be of a strenuous nature.

4—Once a year is often enough to change the lubricant of the transmission and differential mechanisms.

5—Regular light cylinder oil should be used in the transmission, and hard grease in the differential mechanism of the rear-axle.

SHOCK ABSORBER AND STIFF SPRINGS

Roseville, Ill.—Editor Motor Age—Will Motor Age kindly inform me through the Readers' Clearing House what advantage, if any, a friction shock absorber gives to a car equipped with stiff springs, especially those of the semi-elliptic type? My understanding of the use of this type of shock absorber is that it is to eliminate excessive spring vibration, and if such does not exist how can they make an easier riding car?—B. O.

The function of a shock absorber in part is to distribute the bound or rebound of the springs over a longer period of time when the shock is sufficient to bring the springs into action. Thus, with stiff springs the road shocks which would bring the springs into action and cause the body to be thrown up and down will be absorbed in part by the shock absorbers so that the action is not so violent. This will apply to semi-elliptic springs as well as three-quarter or full elliptic.

GAS BAG FOR LAMPS

Seattle, Wash.—Editor Motor Age—I see by issue of February 29 one of Motor Age's readers is troubled with moisture in his gas lamps. I have had a good deal of trouble in this one thing and find that by connecting between the gas lamp and the gas pipe a small gas bag, which can be obtained at any supply house, the trouble is eliminated. This will not only take the moisture out of the gas but will give it an even temperature and stop flickering. It will require, of course, a bag for each lamp.—C. E. Harris.

This method has been used quite extensively and with good results with motor cycle lamps that are supplied by an acetylene generator.

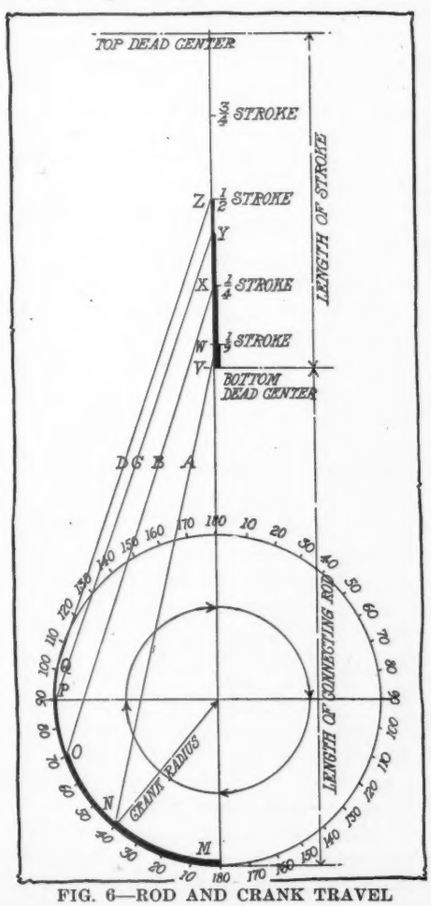


FIG. 6—ROD AND CRANK TRAVEL

Timing of Knight Engine

How Valve Action Is Affected by Angularity of Connecting Rod

OELWEIN, Iowa—Editor Motor Age—The piston of Knight motors seems to travel up on compression nearly one-fourth of the stroke before intake is closed. Would not this shove the fuel mixture out of the cylinder when the car is running slow on high speed?—Amateur.

The conditions which you cite are not true of the Knight motor. The inlet valve closes when the piston has traveled upward but about one-ninth of the compression stroke instead of one-quarter, and the momentum of the incoming gases, which is generated during the suction stroke of the piston, tends to make the gas continue to crowd into the cylinder even after the piston has stopped descending and started to rise. An endeavor is made to close the inlet valve at the point where the tendency of the gas to back out of the cylinder becomes equal to that of the gas in the inlet pipe to crowd in. You no doubt have been misled by the statement that the inlet valve closes 40 degrees after the piston has begun to rise on the compression stroke, and assumed that as 40 degrees is nearly one-fourth of 180 degrees, which is equivalent to a stroke of the piston, the same must be equal to about one-fourth the piston stroke. You have neglected, however, to allow for the angularity of the connecting rod.

Your error is a common one, and in order to make the condition clear to you and the rest of the readers, the diagram, Fig. 6, has been made. The lines A, B, C and D, all are of the same length and represent the connecting rod of a motor. You will note that when the lower end of the rod has moved from its bottom dead center M to the point N, which is 40 degrees of crankshaft travel, the piston has moved only from V, its bottom dead center, up to W, about one-ninth the length of its stroke. Now, in order that the piston may move from V to X, one-fourth the length of the stroke, the crankshaft must turn from M to O, which is about 70 degrees. It also should be interesting to note that when the crankshaft has revolved 90 degrees, from M to P, the piston has not yet traveled one-half the length of its stroke, it being necessary for the crankshaft to turn from M to Q, about 110 degrees, before the piston has moved from V to Z, or one-half its upward stroke.

It should be plain from this that the ever-changing angularity of the connecting rod during a revolution of the crankshaft must needs affect the relation between the piston travel and crank revolution, and this is an important factor in engine timing. The ratio between the length of rod and crank must be considered also.

Current Motor Car Patents

RADIATOR Cap for Motor Cars—No. 1,020,437, dated March 19; to Edmund B. Nelson, Cadiz, Ohio.—This patent pertains to a self-opening cap for motor car radiators whose construction is shown in Fig. 1. It is comprised of a cylindrical wall with a hinged lid L on the top. This lid is secured in the closed position by the pin P which engages the perforation in the lug G of the lid. The head of the pin P is secured to the knurled nut H which has a cam face F mating with the cam face on the end of the horizontal cylindrical casing C. When the knurled nut H is turned in a clockwise direction, it moves outward drawing the pin out of the perforated lug of the lid. The lid is thus released, and the spring S being attached to a lever at the opposite side of the lid causes the lid to open. A spring in the casing C draws the pin P inward and returns the knurled nut to its normal position when released; and the lug L of the lid is so contoured that it is only necessary to jam the lid down into place and it locks itself.

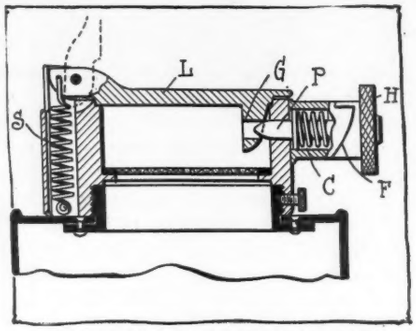


FIG. 1—NELSON RADIATOR CAP

Alarm Signal Device—No. 1,020,768, dated March 19; to Ray H. Manson, Elyria, Ohio—As illustrated in Fig. 2, this patent applies to an electrical horn of the vibrator diaphragm type for motor cars. An electro-magnetically operated vibrator V strikes the pin P, which is secured to the diaphragm D. One of the features of the construction is the provision of a space C between the front chamber wall W to which the horn H is attached and the rear chamber wall R. This allows a draft to flow through the chamber to the exterior and carry off dirt and moisture that otherwise would collect and affect the operation of the diaphragm.

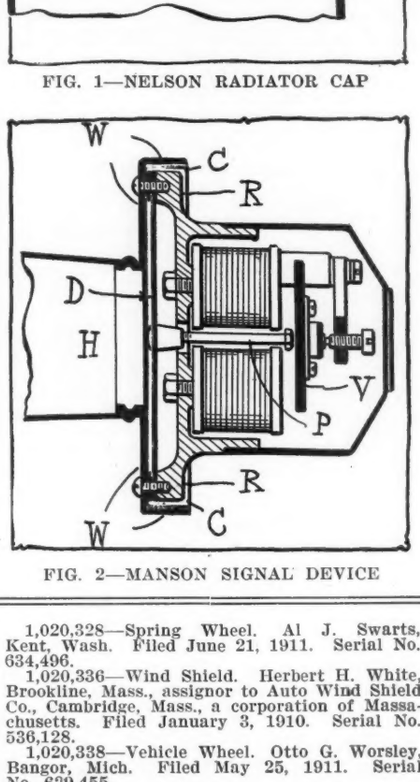


FIG. 2—MANSON SIGNAL DEVICE

Motor Control Mechanism—No. 1,020,889, dated March 19; to Alfred H. Daehler, Los Angeles, Cal.—As shown in Fig. 3, this patent applies to a combination whereby a single control lever arranged over the steering wheel of a vehicle can be used for operating both the spark and throttle of the motor. A circular movement of the lever L operates the throttle lever T which communicates with the carbureter; and a vertically reciprocating movement of the lever L, as indicated by the dotted outlines, imparts movement to the spark control lever R, which communicates with the timer. The lever arm L is pivoted to the stem S and also in the side of the ball-shaped head H at F, the point F serving as a fulcrum.

The motion of the lever in a horizontal direction is communicated to the throttle through the sleeve T and the motion up and down is communicated to the distributer through the stem S.

PATENTS ISSUED MARCH 12, 1912
CONTINUED

1,020,059—Carbureter. Walter F. Schulz, New York. Filed November 11, 1910. Serial No. 591,751.

1,020,080—Control Mechanism for Electric Vehicles. Clyde E. Cochran, Cleveland, Ohio, assignor to Anderson Electric Car Co., Detroit, Mich., a corporation of Michigan. Filed July 28, 1911. Serial No. 640,993.

1,020,081—Gas Engine. Harry G. Dahl, Tarrytown, N. Y., assignor to Maxwell-Briscoe Motor Co., Tarrytown, N. Y., a corporation of New York. Filed August 22, 1911. Serial No. 645,385.

1,020,143—Magnet Frame for Electric Ignition Machines. Gottlob Honold, Stuttgart, Germany, assignor to Robert Bosch, Stuttgart, Germany. Filed May 17, 1910. Serial No. 561,892.

1,020,140—Removable Rim for Vehicle Wheels. Carrol D. Galvin, Merchantsville, N. J., assignor of one-sixth to Amandus F. Jorss, one-sixth to Charles Jacobsen, and one-sixth to Eugene S. Cochran, Washington, D. C. Filed December 6, 1911. Serial No. 664,139.

1,020,198—Carbureter for Internal Combustion Engines. William Wilson Hamill, Glasgow, Scotland. Filed February 26, 1910. Serial No. 546,172.

1,020,218—Valve-Grinding Device. Adolph Okerson, Ishpeming, Mich. Original application filed August 7, 1911. Serial No. 642,743. Divided and this application filed Oct. 28, 1911. Serial No. 657,281.

1,020,223—Clutch Mechanism for Motor Shafts. John Sabatino, Richmond Hill, N. Y., assignor of one-half to Jesse Waldron, Morris Park, N. Y. Filed September 23, 1911. Serial No. 650,870.

1,020,260—Spring Wheel. Elisha W. Burner, Luray, Va. Filed May 22, 1911. Serial No. 628,677.

1,020,266—Process of Burning Liquid Fuel. George E. Clapp, Kalamazoo, Mich. Filed November 14, 1910. Serial No. 592,294.

1,020,270—Carbureter. Royal J. Dunn, Port Huron, Mich. Filed January 9, 1911. Serial No. 601,625.

1,020,288—Tire Tool. Patrick E. Kenney, Celina, Ohio. Filed February 4, 1911. Serial No. 606,662.

1,020,328—Spring Wheel. Al J. Swarts, Kent, Wash. Filed June 21, 1911. Serial No. 634,496.

1,020,336—Wind Shield. Herbert H. White, Brookline, Mass., assignor to Auto Wind Shield Co., Cambridge, Mass., a corporation of Massachusetts. Filed January 3, 1910. Serial No. 536,128.

1,020,338—Vehicle Wheel. Otto G. Worsley, Bangor, Mich. Filed May 25, 1911. Serial No. 629,455.

1,020,375—Motor Car. Robert Symmonds, Jr., Kenosha, Wis., assignor to Thomas B. Jeffery, Kenosha, Wis.; Kate E. Jeffery, Charles T. Jeffery, and Harold W. Jeffery, executors of said Thomas B. Jeffery, deceased. Filed March 11, 1908. Serial No. 420,320.

PATENTS ISSUED MARCH 19, 1912

1,020,417—Differential Gear. Guy M. Hartley, Dighton, Mich. Filed March 18, 1911. Serial No. 615,287.

1,020,437—Radiator Cap for Motor Cars. Edmund B. Nelson, Cadiz, O. Filed February 10, 1910. Serial No. 543,143.

1,020,450—Vehicle Wheel. Charles J. Sandrik, East Pittsburgh, Pa. Filed September 7, 1910. Serial No. 580,825.

1,020,456—Metallic Packing. Joseph A. Simon, Memphis, Tenn. Filed June 20, 1911. Serial No. 634,349.

1,020,464—Motor Car Tire. Winfield Scott Temple, Sidney, Ill. Filed September 28, 1910. Serial No. 584,347.

1,020,465—Auxiliary Steering Device. John M. Topper and George H. Chaplain, Leavenworth, Kans. Filed April 9, 1910. Serial No. 554,571. Renewed August 1, 1911. Serial No. 641,698.

1,020,478—Wheel Rim. Israel J. Carpenter, Marlboro, Mass. Filed April 4, 1911. Serial No. 618,886.

1,020,489—Antiskid-Grip. Leonard B. Gaylor, Stamford, Conn. Filed October 17, 1911. Serial No. 655,234.

1,020,503.—Ignition Device. Delos Holden, Holden, Upper Montclair, N. J. Filed June 20, 1907. Serial No. 379,825.

1,020,518—Motor Vehicle. Eric S. Sandgren and Charles F. Case, Detroit, Mich., assignors to Oliver Motor Car Co., Detroit, Mich. Filed September 30, 1910. Serial No. 584,673.

1,020,522—Circuit-Making and Breaking Device. Winthrop A. Stiles, Philadelphia, Pa. Filed October 11, 1909. Serial No. 522,145.

1,020,523—Roller Bearing. Ernest J. Taylor, Highlandville, Mass. Filed May 17, 1907. Serial No. 374,305.

1,020,535—Sectional Valve for Gas Engines. Lupu William Brenner, Dayton, O. Filed May 26, 1911. Serial No. 629,639.

1,020,549—Vehicle Tire. Rudolph Glabaznya, Chicago, Ill. Filed June 24, 1911. Serial No. 635,162.

1,020,636—Vehicle. John Charter, Whitman, Mass. Filed May 2, 1910. Serial No. 558,962.

1,020,707—Steering Device for Motor Cars. Hermann Lemp, Lynn, Mass., assignor to General Electric Co. Filed November 9, 1905. Serial No. 286,489.

1,020,729—Ball Bearing. Gustavo Vincon, Turin, Italy. Filed February 16, 1909. Serial No. 478,145.

1,020,732—Reversible Lamp Base. Theodore A. Willard, Cleveland, O. Filed June 6, 1910. Serial No. 565,386.

1,020,768—Alarm Signal Device. Ray H. Manson, Elyria, O., assignor to Dean Electric Co. Filed May 10, 1911. Serial No. 626,216.

1,020,778—Clutch. Maurice Nowal Prange, Detroit, Mich. Filed August 26, 1911. Serial No. 646,136.

1,020,797—Vehicle Wheel Rim. Heinrich Bussing, Brunswick, Germany. Filed March 18, 1911. Serial No. 615,400.

1,020,799—Safety Crank for Explosion Engines. William R. Clark, Muncie, Ind. Filed December 10, 1910. Serial No. 596,571.

1,020,804—Tire. Samuel A. Deatherage, Richmond, Ky. Filed March 29, 1911. Serial No. 617,809.

1,020,836—Piston for Expansion Engines. Robert S. Moore, Washington, D. C., assignor to Gyro Motor Co. Filed September 7, 1911. Serial No. 648,222.

1,020,889—Motor Controlling Mechanism for Self-Propelled Vehicles. Alfred H. Daehler, Los Angeles, Cal. Filed August 30, 1907.

1,020,915—Float-Feed Carbureter. Elden P. Lamb, Camden, Me., assignor to Camden Anchor-Rockland Machine Co. Filed August 30, 1909. Serial No. 515,239. Filed June 15, 1910. Serial No. 567,042.

1,020,931—Carbureter. Clement Smith, Topeka, Kans. Filed November 3, 1910. Serial No. 590,490.

Legal Lights and Side Lights

SUIT UNUSUALLY INTERESTING

JUDGE CRUMP of the law and equity court of Richmond, Va., has granted a new trial in the suit of John A. Coke, Jr., against the Gordon Motor Co. In this case several interesting law points are involved which have never been finally determined by a Virginia court. Mr. Coke bought a car some time ago from the Gordon Motor Co., which he alleges did not come up to the specifications, and after an extended and hotly contested suit, a jury rendered a verdict of damages in the sum of $3,150 in favor of Coke. Motion to set aside the verdict was pending when Judge Ingram, who heard the suit, became ill and died. Judge Crump holds, in effect, that he is without authority to enter a judgment in the case, which he had not himself heard, and that he has been unable to review the case since neither side had furnished him a complete stenographic transcript of the evidence taken. The case is again placed upon the docket upon the original issues.

DRAWING IT FINE

During the past week members of the Overland-Buffalo Co. of Buffalo, N. Y., were summoned to court before Justice Brennan charged with knowing something of an alleged game of chance and lottery in which a motor car was the principal figure. It was brought out that a car had been purchased by a man whose name was withheld, and that man had arranged with local printers for the printing of cards calling for a chance on the car, drawing to take place on June 1. Then, it was alleged, the printers sold the cards to merchants who in turn presented the cards to customers who bought merchandise amounting a a certain figure. Howard B. Smith, president of the Overland-Buffalo Co., declared his only part in the matter was the sale of the machine. The hearing was adjourned.

FIGHTING CHAUFFEUR TAX

When Chief Judge Brennan in the City Court of Buffalo, N. Y., the past week discharged a chauffeur after finding him guilty of running a motor car in the Buffalo streets without a license, Charles J. Staples, attorney for the chauffeur, demanded that the judge tax a fine of $5 on his client. The judge fined the chauffeur and now Attorney Staples is delighted. The case is that of Theodore Meinhardt, who asked to be arrested in January because he was driving a car without a license. Meinhardt acted on the advice of the Chauffeurs' Club which is working on a principle. Attorney Staples in briefs in the Meinhardt case submitted to the court, declared the law is unconstitutional in its reference to taxing of chauffeurs, in addition to its being arbitrary and discriminating. Mr. Staples declared that statistics proved that more accidents are caused by owners of cars, who are not chauffeurs, and by inexperienced drivers than are caused by chauffeurs. Yet, protested Attorney Staples, the experienced chauffeur must pay a tax while the inexperienced man is allowed to drive without a license. Henry W. Killeen was attorney for the state. An appeal by the Chauffeurs' Club already has been taken, and if the lower courts do not declare the act to be unconstitutional the case will be carried to the highest courts.

STUDENTS EXEMPTED

According to a decision in City Court made by Justice Brennan of Buffalo, N. Y., students in motor schools are allowed to drive a car without a chauffeur's license. Any way, William D. Gelser, a student in the Edward Street Automobile School, conducted by Clarence Clifford of Buffalo, was discharged by Justice Brennan. The patrolman who arrested Gelser produced evidence showing that Gelser, who was running the car, had no license. District Attorney Dudley was unable to produce any law that would prohibit scholars from using a motor car without a license and the case was dismissed.

WOULD DEFINE CHAUFFEUR

To get a definition of the word chauffeur in the new Minnesota state law members of the Minneapolis Automobile Show Association have decided to back a test case to the Supreme Court if necessary. G. A. Will, attorney for the Minneapolis Automobile Club, is chosen to act as counsel. The action follows several arrests of men driving cars under the orders of the superintendent of police, in both Twin Cities. Men driving cars who were not owners, or who could not show chauffeurs' license tags, were arrested. Several pleaded guilty, but dealers employing testers, demonstrators and shop men who deliver cars to freight depots saw the danger of being involved in heavy expense which they deem not proper, and a consultation with the police resulted in the decision to get judicial determination of the meaning of the word chauffeur. The case is set for March 29. The man chosen is a mechanic at the H. E. Wilcox Motor Car Co. factory.

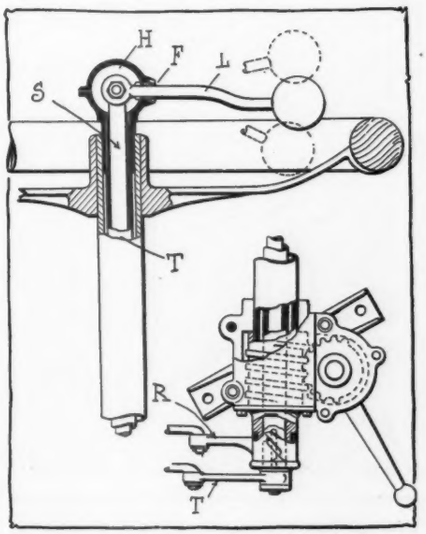


FIG. 3—DAEHLER ENGINE CONTROL

OF INTEREST TO DEALERS

Albert Poppenberg, a dealer in Buffalo, N. Y., is complainant in a peculiar case here against Frank Pelycynski, a former business man of this city. Some time ago Pelcynski purchased a motor car from the Poppenberg company. The machine was valued at $1,200, but Mr. Pelcynski paid $300 down, gave a small mortgage on real estate for security, and promised to make monthly payments until the total cost of the car had been paid. Then Pelcynski had the machine insured for more than its value, but a short while afterward it was destroyed by fire. It is said that Pelcynski collected the insurance, but Poppenberg never received the balance due, and he had a warrant sworn out for the man's arrest. The case will be heard within a few days.

RECENT RULINGS

To entitle an unlicensed person driving a motor car to the protection of a statute permitting the operation of the machine by an unlicensed person if riding with or accompanied by a licensed chauffeur or operator, it is held in Bourne vs. Whitman (Mass.) 35 L.R.A.(N.S) 701, that there must be knowledge on the part of both parties of the existence of a relation like that of operator without a license, and licensed chauffeur or operator accompanying him, but that if such knowledge exists, the operator will be protected, although it was not expected that one would exercise any supervision over the other if the operator was in fact competent.

QUEBEC TO CONTROL CHAUFFEURS

In the Quebec legislature an amendment was passed which will give the city the right to make by-laws controlling chauffeurs of cars and taxicabs kept for hire, as cabmen are now controlled, and giving the city the right to inspect the meters in taxicabs. It will also make it possible to establish a fine for passengers in these vehicles who do not pay the regular fare, the standard for which will be set by the city. This has not hitherto been possible.

From the Four Winds

RAIMEY an Ohio Driver—John Raimey, who last year raced a Cino, has joined the Ohio racing team.

Racing at San Jose—At a sanctioned track meet at San Jose, Cal., March 17, Earl Cooper in a Stutz won the 25-mile race in 25:18. R. Jeffkins in a Velie reduced the track record to :55 1-5. Earl De Vore, Buick, won the 10-mile event in 10:40 2-5.

Canadian Club Thriving—The London and Western Motor Club, organized at London, Ont., about 3 weeks ago, continues to boom, and now has a membership of over 225 motorists. There are practically 275 owners in London, and including about twenty-five new owners it is believed there will be 300 members of the new organization before the opening of the motor season.

New Wisconsin Organizations—A new club has been organized at Chippewa Falls, Wis., and will be known as the Chippewa County Automobile Club. Fifty signed the charter roll. Motorists of Cadott, Stanley, Boyd and Bloomer have joined with owners in Chippewa Falls. State Organizer M. C. Moore of the Wisconsin State A. A., has formed temporary organizations of motorists in Neenah and Menasha, Wis., twin cities. A club is also being formed at Fond du Lac, Wis.

Change in Club Plans—The transition of the Hartford Automobile Club from a social organization to one for business purposes only will be marked by the removal of the club quarters about May 1 to new quarters in the Charter Oak building, Hartford, Conn. This move will mean less expense for the club. Colonel Louis R. Cheney, the newly-elected president, intends to wage a vigorous campaign to strengthen the club, and a circular letter embodying the ideas of the organization has been sent to all members and to every motorist in Hartford county.

May Change Medal Conditions—According to a member of the Victoria Automobile Association under whose auspices the Victoria to Winnipeg tour is being held, if the gold medal that is offered for the first car that makes the trip is not won this year the rules will be changed that it will be necessary for all the tour to be made through Canadian territory. At present the entrant may go by way of Seattle and Snoqualmie pass, crossing over the international boundary line in eastern Washington. This will avoid the necessity of going through the Hope mountains, which at the present time are absolutely impassable. As this is the route of the Canadian highway it is expected that within another year work will have progressed so that it will be possible to get through, which is the reason for the determination on the part of the Victoria sponsers for the run to withdraw the privilege of making part of the tour outside of Canadian territory.

Another Club Lined Up—Newton, Mass., is the next city in the Bay State that will be represented by a motor club. A number of Boston dealers reside in Newton, and with the large number of motorists in the city a large club could be formed. The club will not be formed for social purposes, but rather to advance the interests of motoring by co-operating with motorists of other cities and towns in the state.

Campaign for New Members—The Massachusetts State A. A. held a meeting last week in Boston, and the directors appointed a committee to get in touch with the motorists throughout Massachusetts in an endeavor to secure new members. The state association now has fewer than 5,000 members while there are some 35,000 motorists in the state, and the object is to increase the membership in order that better work may be done in preventing hostile legislation and securing better roads.

Little Glidden Route Settled.—A tentative route for the Des Moines Little Glidden tour which this season will develop into an all-state endurance run has been decided upon by W. E. Moyer, president of the Iowa State Automobile Association. The tour will start from Des Moines sometime in June and will follow the River-to-River road to Council Bluffs where the tourists will cross the river to Omaha to be entertained by Omaha Automobile Club, returning to the Iowa side of the river and up the river to Sioux City. From Sioux City the tour will follow one of the northern cross-state roads to Dubuque, and thence to Keokuk. From Keokuk the tour will return to Des Moines over the Waubonsie trail. Six days will be spent on the run.

STUTZ MAGNIFYING GLASS ON SPEEDOMETER FOR RACING WORK

Recognition for Anderson—John Drummond Anderson of Spokane has been elected vice-president of the Canadian Highway Association with headquarters at Trail, B. C.

Atlanta Climb Certain—The Atlanta Automobile and Accessory Dealers' Association, of Atlanta, Ga., has decided not only to hold a hill-climb early in May but also to charter a special car to go to the Indianapolis race on Decoration day. It has been informally decided that the climb shall be for stock cars, under the A. A. A. rules and under a price classification.

Club at Brookline, Mass.—A number of Brookline, Mass., motorists have formed the Brookline Automobile Club. The following officers were elected: Benjamin P. Richardson, president; Lawrence Whitcomb, vice-president; Emmons Raymond, secretary-treasurer; Anson M. Lyman, Arthur F. Clarke, Wallis B. Badger, K. Gaines Gillette and Clarence P. Seaverns, board of governors.

New Motor Job—F. R. Wiley has been appointed road investigating agent by the Decatur Automobile Club of Decatur, Ill. It will be his duty to read up on all Illinois statutes relating to road improvement and government of the highway and also to keep posted upon all methods of constructing and maintaining good roads. In creating this position, it is desired to launch an educational campaign which will result eventually in the people taking up the question of road improvement themselves.

More New England Motor Shows—That the motor show season in New England is not yet over is apparent from the dates announced for others there. There is to be one at Waterbury, Conn., beginning March 27. There is to be a show at Auburn, Me., April 4, 5 and 6 under the auspices of J. Henry Graham, who also is planning to hold a show at Lewiston, Me., the latter part of April. Vermont's big show is to be held at Burlington beginning April 29 and continue for a week in the armory.

Elections in Wisconsin—The Green County Automobile Association, member of the Wisconsin State A. A. and A. A. A., elected R. D. Gorham, president; Paul J. Weirich, secretary; W. B. Monroe, vice-president, and J. H. Durst, treasurer. The headquarters are at Monroe, Wis. The newly-organized Kenosha Automobile Club has elected the following officers: President, John M. Kehlor; vice-president, Dan O. Head; secretary, Russell H. Jones; treasurer, Harry Robinson. The club has 173 members and is the largest in propor-

tion to population in the country. Kenosha, Wis., has 22,000 inhabitants.

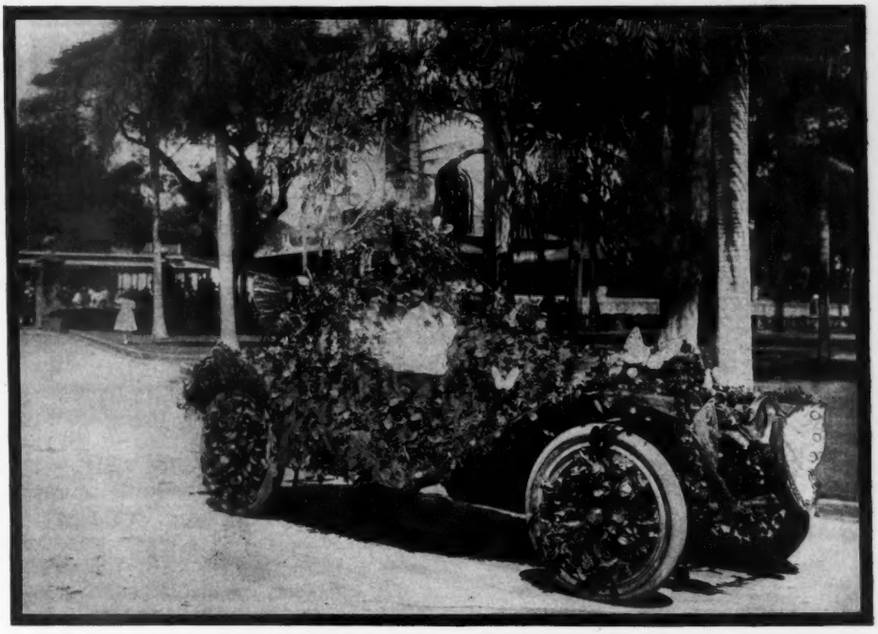
Protecting the Soldiers—Due to the recent injury of several cavalrymen due to the horses being frightened by motor cars, the military authorities at New Orleans have prohibited speeding and the sounding of signals when motorists pass divisions of cavalry on the road.

Owners Help Road Scheme—A movement is under way in the Fox River valley of Wisconsin to build a macadam highway connecting the principal cities at private expense. Motor car owners have been asked to subscribe $10 each. The proposed highway will be 7 miles long and start at Neenah-Menasha, the twin cities at the head of Lake Winnebago, running to Appleton.

Want a Boulevard Road—The Lowell Automobile League and the motorists of that city and Lawrence, Mass., are working toward the completion of a river boulevard along the Merrimac river connecting the two cities. There is a road connecting the two cities now, but it has not been accepted by the state highway commission, and the county commissioners refuse to spend any more money on it. If the state takes it over it will make a splendid boulevard of it and the motorists are trying to get enough interest in the project to have the legislature take some action on the matter.

Merger Discussed in Wilmington—A proposition is under consideration in Wilmington, Del., to merge the Delaware Automobile Association, which maintains no clubhouse, and the Wilmington Yacht Club, which has a fine clubhouse on the Delaware river, just above Wilmington, but, according to some of the officers of the Delaware Automobile Association, the merger is not likely to be consummated. However, as the two clubs have social events in common, each has appointed a committee to co-operate with the other in such projects, the matter of a merger to be left for future consideration.

Saskatchewan Car Count—The provincial registrar for Saskatchewan estimates that there will be at least 3,500 licenses issued in the province for 1912 as against 1,700 in 1911. Last year Calgary had 700 cars in use, and this number will be increased to 1,500 during the present season if the dealers are able to obtain delivery of all the cars that they have sold. Edmonton, which had 325 cars in 1911, will more than double this number during the present season. In 1906 only forty-one licenses were issued for the entire province so that it will be seen that the business is growing at a very rapid rate. Sixty-six garage and dealers' licenses have been issued, twenty-six of which are in Edmonton and forty in Calgary. Regina licenses have not yet been taken out, but it is safe to assert that the total licenses for this point will far outnumber the other two put together.



NATIONAL CAR OWNED BY FRED BURNHAM, OF NEW YORK, THAT WON PRIZE IN HONOLULU FLORAL PARADE

Between fifty and sixty dealers' licenses will be issued for the city of Winnipeg in 1912 and the total for the province will be well over the 300 mark.

Hearne on Case Team—E. A. Hearne, of Chicago, runner-up in the Savannah grand prix, will be on the Case team at Indianapolis along with Disbrow and Herrick.

Ford Test at Portland—A. J. Edwards, Portland manager of the Ford, recently conducted a non-motor-stop run, the car completing in the 7 days' continuous run 2,391 miles. During the week's run it is claimed but 109 gallons of gasoline were consumed, giving an average of a fraction less than 22 miles per gallon.

Good for Racing Drivers—A novel feature to be found on Stutz racing cars, as illustrated, is a magnifying glass in focus with the driver's position, by which he can see the entire dial of the speedometer, enlarged several diameters. H. C. Stutz, chief engineer of the Ideal Motor Car Co., manufacturer of the Stutz, originated this idea.

Fight for Illinois' Tag Money—Efforts of some politicians in Illinois to divide the motor registration money equally among all of the townships of the state is strenuously opposed by central Illinois car owners. They wish only the main roads to receive the benefit of the state fund, the townships to improve the connecting roads.

Balk at Two Brakes—As a precaution against accidents, an ordinance has been passed at Kingston, Jamaica, prohibiting the operation of motor cars not provided with two brakes. The law specifies that the brakes must be powerful in action, must be entirely independent of each other and one of the brakes must be attached to the driving wheels. As nearly all the cars in use on the island are provided with only one brake and as the installation of another brake offers many difficulties, motorists have raised a general objection to the regulation.

Car Maker Is Generous—The Grand Rapids Anti-Tuberculosis Society of Grand Rapids, Mich., has been presented with a car by the Hupp Motor Car Co. of Detroit, to be used by the visiting nurses.

Now It's Gouverneur—Gouverneur, of St Lawrence county, N. Y., with about 2,000 inhabitants, claims to have more cars for its size than any other village in the country. More than eighty cars are owned there, representing a total outlay of $150,000. One of the most enthusiastic motorists is Jay Corbin, 72 years old.

Porto Rico Takes to Motoring—The sale of motor cars at San Juan, Porto Rico, thus far this year has been unprecedented. From one to twenty motor cars form a part of the cargo of every arriving ship. There now are registered in San Juan 726 motor cars. Of this number twenty-five are trucks. This does not include a number of trucks that are in operation on the plantations. The old Spanish military roads on the island make ideal highways for motoring.

Want Parks Opened—The motorists of New Haven, Conn., backed by the New Haven Automobile Club, has started an agitation looking to the opening of East Rock and West Rock parks to motor cars this summer. All cars are barred from both parks at present, and Mayor Frank J. Rice is reported as being favorable to opening West Rock Park, but he thinks there is too much danger of accidents to allow cars the use of the other one. A compromise may be effected allowing motor cars to use the park roads certain days of the week.

Standard Motor Constructions Concluded

Products of Model Gas Engine Works and the Davis Mfg. Co. Described and Illustrated—A Great Variety of Styles Is Sizes of Power Units are Made by These Concerns —Reynolds Rotary Valve Engine a Feature of One Company's Line

Part IV

By George Gaidzik

IN ADDITION to a great variety of traction, marine and stationary engines of single and multi-cylinder design and ranging from 2 to 500 horsepower, the Model Gas Engine Works, Peru, Ind., is manufacturing a very comprehensive line of motors and unit power plants for motor cars.

The Reynolds rotary valve motor which already has been thoroughly described and illustrated in these pages, is one of the features of the line for 1912, and as shown in Fig. 1 it is being produced in combination with a unit power plant.

Two Standard Four-Cylinder Types

As for the standard Model designs, there are two four-cylinder types; one an L-head construction with cylinders cast in pairs as is shown in Fig. 3, is made in two sizes, 3½-inch bore and 4½-inch stroke, and 3⅝-inch bore by 4¾-inch stroke; the other type is shown in section in Fig. 2, and its cylinders are cast separately and have the exhaust valves in the head, and the inlet valves in offset chambers at the sides as in an L-head motor. The last-mentioned motor is made in seven different sizes ranging from 30 to 55 horsepower; Two of these are of the long-stroke order. One of the special long stroke motors has a 4¼-inch bore by 5½-inch stroke and is rated at 40 horsepower, the other has a 4½-inch bore and 6-inch stroke and rated 50 horsepower.

Very little change is to be found in the standard Model engines for 1912 over those of 1911; however, all motors now are built with packing glands to prevent leakage of oil from around the crankshaft; spiral engine gears have replaced the spur design and oil is delivered onto them in quantities to reduce noise; and transmission gearsets are provided with a wedge-shaped locking device in place of the ball as formerly used.

The chief characteristic of the Model unit power plants is the method employed to unite the motor and transmission gearset without enclosing the flywheel. There are two short arms cast integral with the aluminum crankcase of the motor, which curve outward and backward; and at a point opposite the flywheel, two longer but similar arms cast integral with the transmission case, are bolted to the arms of the motor. An advantage claimed for this construction is that of the accessibility to the clutch-operating mechanisms.

Among the notable features of Model construction, attention is called to one of the methods of eliminating excess weight by fastening the cylinders and bearing caps to the base, by means of studs running entirely through the base, one end of the stud holding the bearing cap and the other end holding the cylinder. This relieves the crankcase of the strain of the piston thrust, adds strength and permits of a reduction in weight.

A few words on the details of Model gas engine construction will give a fair idea of the methods employed. In machining the cylinders they are first bored to a diameter a trifle smaller than the finished size, and the end where they bolt to the crankcase finished. They then are set aside to allow them to attain their normal shape, after which they are placed in a jig and ground, then polished, so that each cylinder is alike and interchangeable. The head of the cylinder as well as the side walls is finished, leaving no rough places for the collection of carbon and no chance for difference in the compression of the different cylinders.

Pistons Long and Light

Pistons are long and light, and are made from the same quality of metal as the cylinders. Every piston is turned nearly to size or ready for grinding; then it is annealed to take off all unequal strain of the metal and ground to size. This method of construction permits of a closer fit in the cylinder than is possible where pistons are ground before annealing or not annealed at all. The piston pin is hollow, hardened and ground. It is held in place in the piston by a steel snap ring, which does away with all studs, or set screws for holding the piston pin, and making it impossible for the pin to work out and cut the cylinder.

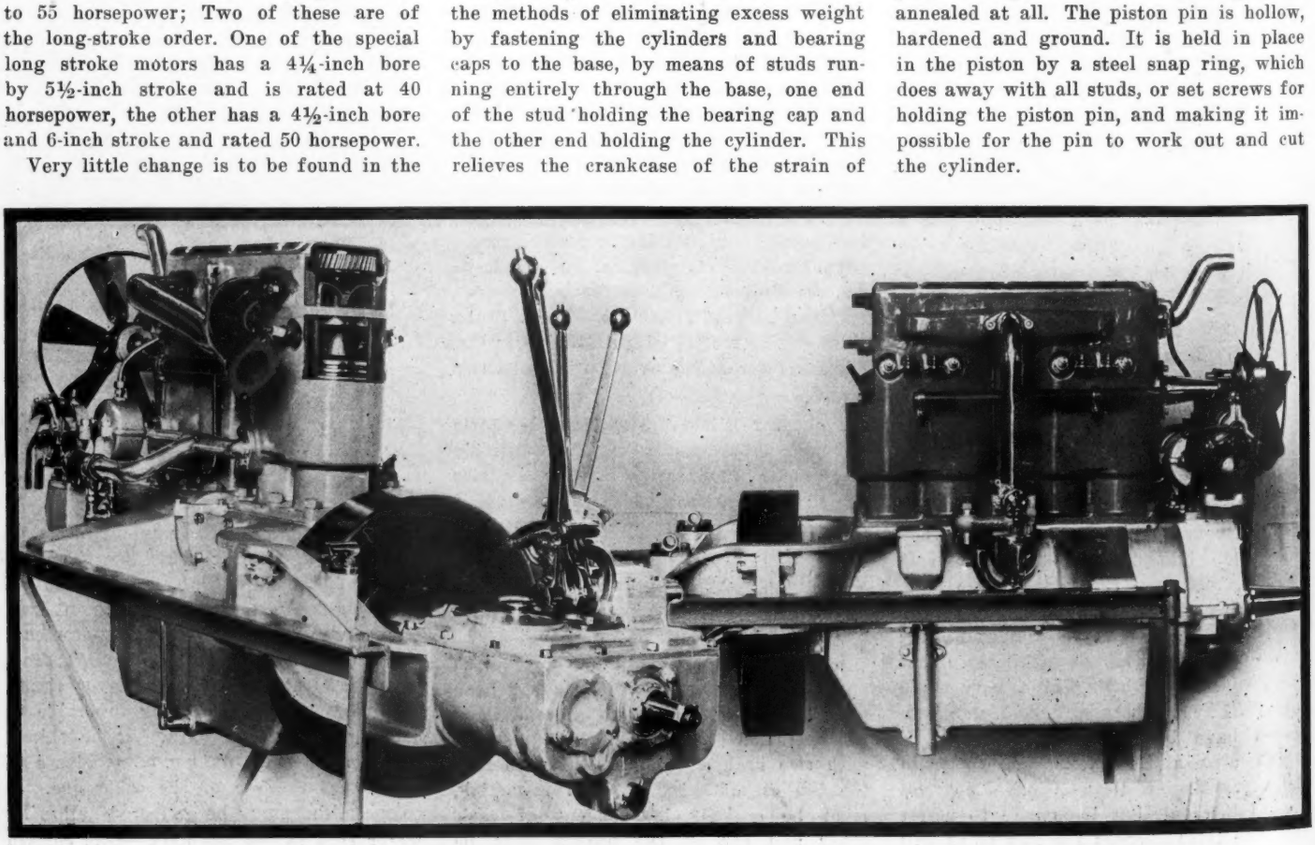


FIG. 1—SHOWING LEFT AND RIGHT SIDES OF MODEL UNIT POWER PLANT WITH REYNOLDS MOTOR

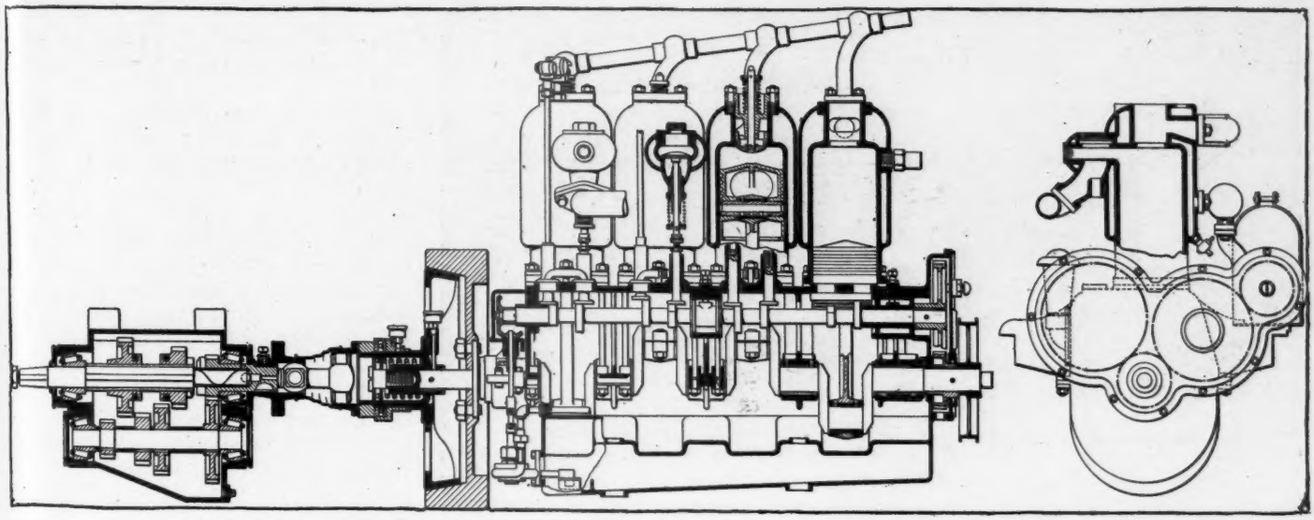


FIG. 2—SECTIONAL VIEW OF ONE UNIT POWER PLANT MADE BY MODEL GAS ENGINE WORKS

Connecting rods are of drop forged steel of I-section. The crankpin ends are equipped with the die-cast babbit bushings, and the piston ends are fitted with phosphor bronze bushings.

In the motor with separately cast cylinders a five-bearing crankshaft is employed. The crankshaft is offset from the cylinders to relieve the engine of excessive side thrust due to angularity of the connecting rods; and it is mounted on nickel babbit bearings cast in steel dies. The main bearing caps are made of manganese bronze, into which the moulded babbit bearings are fiitted.

The Cam Operating Mechanisms

The camshaft is provided with three main bearings, and so arranged that by loosening nuts on two of these bearings, the camshaft can be withdrawn with all cams and commutator gear, and without destroying the adjustment of the motor. Cams are integral with the shaft which is made of tool steel hardened and ground. Valve lifters are offset so that they will revolve. This gives them a roller effect which reduces and distributes the wear. They are of tool steel tempered, and have means for adjustment of the space between them and the valve stems. Valves have cast iron heads and steel stems.

A centrifugal water pump and an adjustable belt-driven fan are features of the cooling system. Provisions are made for suitable attachment of any standard make of magneto and timer; and lubrication of the motor is by means of a circulating splash system.

In the unit power plants, a cone clutch is fitted which is made of aluminum and steel and lined with an asbestos fiber into which copper threads are woven. A ball thrust collar is employed and all working parts are thoroughly enclosed.

Like the clutch the transmission gearset is built in sizes to suit the different sizes of motors and is of the selective, sliding-gear type, giving three forward speeds and reverse. All gears are 6-8 pitch or what is known as the stub tooth; and the width of the face runs from ¾ to 1 inch, depending upon the size of the gearset. Timken roller bearings are used.

The Davis Mfg. Co.'s Product

A variety of different styles and sizes of motors is made by the Davis Mfg. Co., Milwaukee, Wis. The line includes two and four-cylinder opposed engines for commercial vehicles and marine service, substantial vertical four-cylinder motors with cylinders cast in pairs and in block, and a unit power plant comprising a vertical four-cylinder four-cycle block motor with L-head cylinders disk clutch, and selective sliding gearset giving three forward speeds.

As shown in Fig. 4, the new unit power plant which is one of the latest features of the company's product, is a very neat design, and it combines many features of the most improved and advanced engineering practice. The cylinders have a 4-inch bore and stroke, and the cylinder casting is mounted on a barrel-type cast aluminum crankcase which is designed for three-point suspension. A short stout crankshaft is employed whose crankpins are 2¼ inches in diameter and 2½ inches in length, and it is mounted on two large Hess-Bright annular ball bearings. Valves are all on one side inclosed so as to be noiseless and protected from dust and dirt. The magneto is arranged transversely at the front end of the motor where its breaker-box and distributer may be easily examined.

Generous Water Space Provided

Cylinders are cast with a generous water space in the jackets to insure ample cooling and are carefully ground and finished to size. Pistons also are ground to size, and each is fitted with three compression rings. Connecting rods are drop-forged with the caps at the lower ends secured by two ½-inch bolts; and lined with die-cast babbitt metal. The piston pin is 1 inch in diameter, hardened and ground, and clamped in the piston end of the connecting rod. Cams are forged integral with the camshaft, which is hardened and ground. Pushrods are adjustable and are inclosed with the valve springs, so they should operate noiselessly

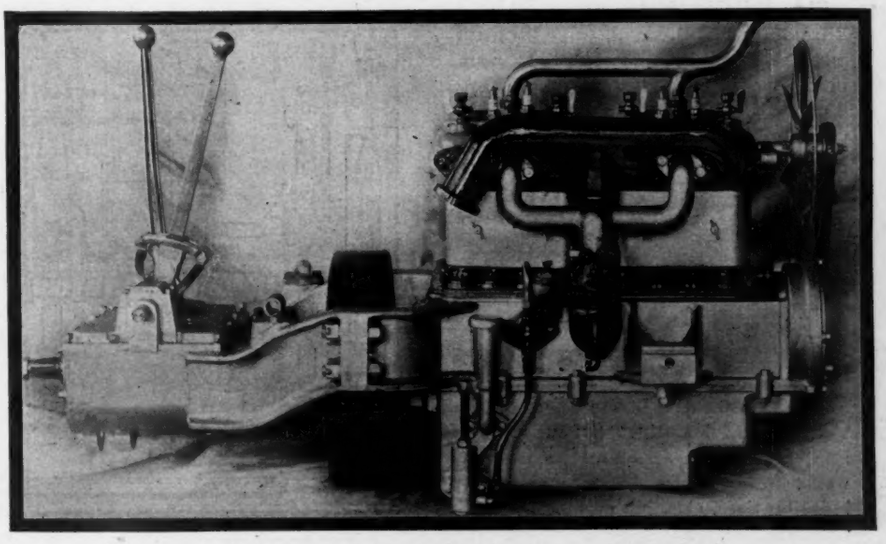


FIG. 3—MODEL UNIT POWER PLANT WITH L-TYPE MOTOR

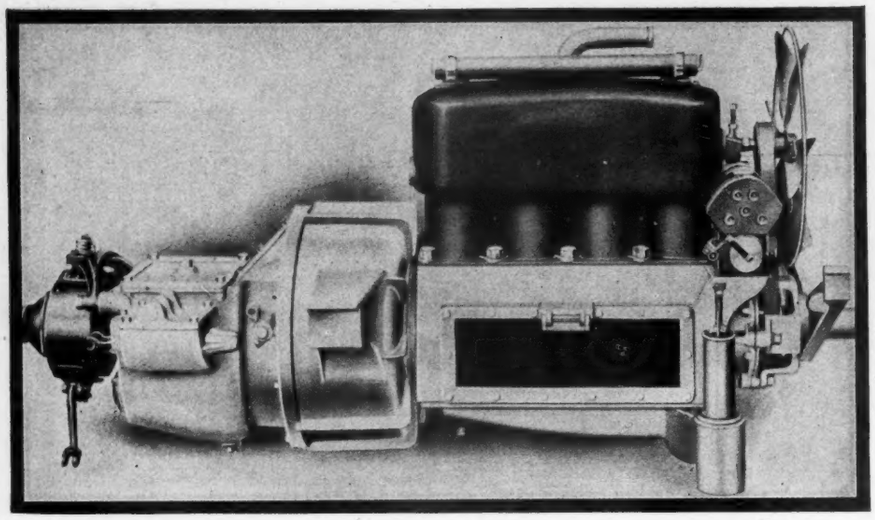


FIG. 4—THE DAVIS MFG. CO.'S NEW UNIT POWER PLANT

and be free from ruinous dust and dirt.

Attention is called to the large inspection plate on the side of the crankcase. This may be easily removed for adjustment or inspection of the connecting rod bearings, making it unnecessary to remove the bottom pan of the motor.

The bottom portion of the motor crankcase comprises the oil reservoir of the circulating splash lubrication system and as shown in the illustration, a float gauge is provided at the lower right front end of the case to show the amount of oil contained in the reservoir. A gear-driven gear pump maintains the oil circulation.

This power plant also can be furnished with a 4⅛ by 4½-inch four-cylinder, ball-bearing motor.

MOTOR CAR LITERATURE

Rims, the title of a recent catalog received from the Standard Welding Co., Cleveland, O., describes in detail the mechanical features of the universal detachable-demountable rims, and illustrates same, giving also complete instructions for attaching such rims to wheels.

The Reliable jack, marketed by the Elite Mfg. Co., Ashland, O., is illustrated and described in a conventional manner in the company's latest catalog.

The Omaha Motor Club in its 1912 year book gives a short historical sketch of the club, followed with the constitution and by-laws and a roster of the members. There also are portrait illustrations of the club's officers.

In a conventional catalog, the Kie Nie Mfg. Co., Minneapolis, Minn., features its line of chemical accessories, such as radiator compounds, enamels, valve-grinding compounds, mohair top cleaners, etc.

The International Steam Pump Co., New York, in its bulletin C-207 describes its line of Clayton air compressors for garage work, these compressors being suitable for inflating tires, cleaning cushions, soldering purposes, etc. The types shown are both stationary and portable.

The Motorists' Bookman

SAMUEL CHANDLER EARLE, in his "Theory and Practice of Technical Writing," devotes the entire volume of over 300 pages to a study of the theory and practice of technical writing, which embodies the construction, operation, etc., of mechanical constructions. A volume of this nature is of interest to motor car people, namely, those in the advertising department who are trying to give concepts of their product, and also those to whom is entrusted the preparation of instruction books and catalogs. The author makes an analysis of many constructions, showing the logical method of description. The first example is the transit. A complete analysis is made beginning with its use; following this is its general structure and lastly comes the method of using it and the details of its construction. The value of the book consists in the many analyses of this nature, together with the reasons advanced for each. According to the author, when an engineer aims at writing in connection with his professional work his whole problem is to give to his expression the four qualities of accuracy, completeness, logicalness and economy of presentation. This volume should find a place in every advertising and engineering department. Macmillan Co., New York. Price $1.25 net.

Touring In Australia

To those who are looking for valuable touring information in Australia, "The Locust and the Ladybird," by Archibald Birt, is a disappointment; those who want a book along a lighter vein to while away an idle hour, the book will appeal. The story is written in the form of letters from the author to his sister. Two women, accompanied by their chauffeur, meet with an accident to their car, the Ladybird, and are overtaken and given assistance by two young men motoring in the Locust. Through bribery the chauffeur of the Ladybird was induced to keep the car in a chronic disabled condition, and the tour ended to the tune of the marriage bell. Published by Sampson Low, Marston & Co., London.

Engineering Articles

Volume 5 of the Proceedings Session 1910-1911, of the Incorporated Institution of Automobile Engineers, deals with the many factors contributing to the development of motor car engineering. Besides the reports from the different committees, and a roster of the members and committees, there are many interesting papers. The book is published by the Institution, Wesminster, England.

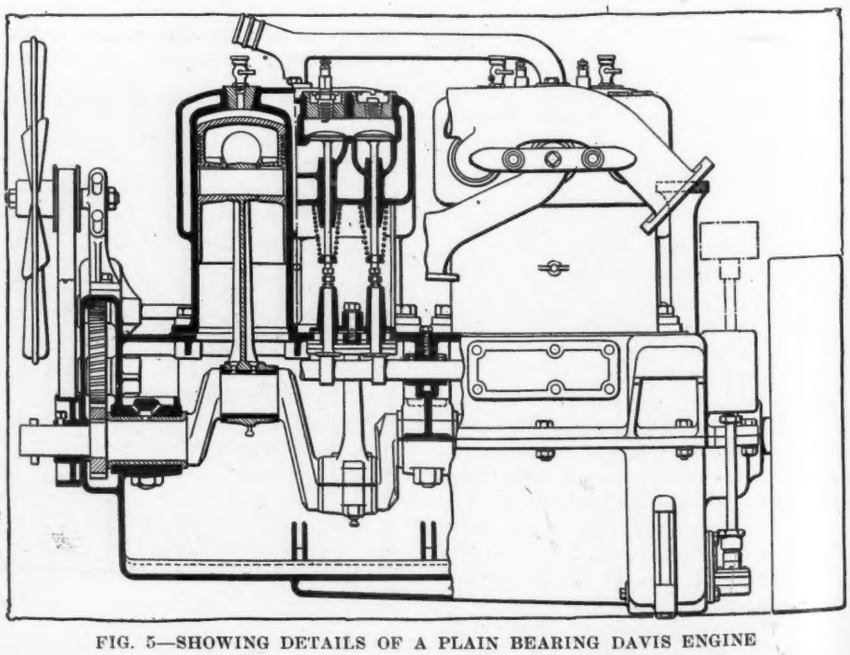


FIG. 5—SHOWING DETAILS OF A PLAIN BEARING DAVIS ENGINE

The Motor Car Repair Shop

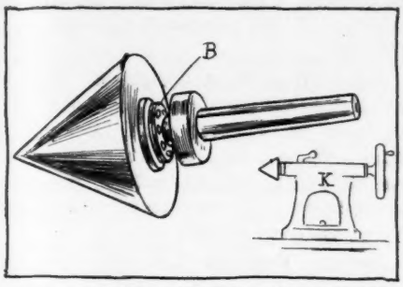


FIG. 1—LATHE CENTER FOR TUBING

Device Which Facilitates Turning Metal Off Outside of Piece of Tubing—Method of Aligning Car Wheels

IT often happens that the motor car repairman is required to turn a little metal off the outside of a piece of pipe or tubing, and in order to do this accurately, it is necessary to rest the end farthest from the chuck either in the steady rest or on some suitable lathe center such as is shown in Fig. 1. The use of the steady rest is most unhandy, and in order to avoid its use and thereby facilitate operations on tubing and the like, the Peerless repairshop, Chicago, has been equipped with a center for the tail stock of a lathe which has a revolving cone on it sufficiently large to center and secure a piece of 3-inch pipe. As illustrated, this tail-stock center is provided with a ball thrust bearing B; and it fits into the tail-stock as at K. As the revolving portion is conical in shape, any size of tubing or pipe can be centered upon it; it simply being necessary that the end of the tubing be cut off square, and any burr removed from the inner edge.

Alignment of Motor Car Wheels

There are many repairshops throughout the country where no facilities are provided for testing the alignment of motor car wheels. This often is due to the fact that heretofore only the apparently more serious kinds of motor car trouble were brought to the attention of the majority of repairmen. Now, however, that the once serious causes of trouble have been, to a great extent, eliminated by advanced constructions and designs, or simplified by the same and the education of the repairmen, the motorist is getting down to the fine points of the business and demanding of the repairman the real reasons for unusual tire wear, harder steering, and poor service from the rear-wheel brakes.

The three last mentioned causes of trouble are very common, and often misunderstood. For instance, excessive tire wear on the front wheels may be due to mis-alignment of the front wheels. There are many repairmen who do not know that in order to run truly parallel the tie-rod between the steering arms of the front wheels generally should be adjusted so that the extreme front of the wheels are from ¼- to ⅜-inch closer together than the extreme rear portions. Lack of adjustment in this respect also tends to make steering a little more tiresome. Steering is most effected by vertical mis-alignment of the front wheels, when the axle, or steering knuckles have been bent, so that the wheels are nearly vertically parallel, or converge outwardly towards the bottom, instead of converging inwardly at the bottom. When the wheels converge inwardly toward the bottom at the proper angle, there should be practically no side thrust on the steering-knuckle pin. But when diverging from this proper angle, there is considerable side-thrust or binding of the steering knuckle pin and much more energy is required to move the steering wheel than would be necessary were the wheels in proper alignment. This hard steering not only is disagreeable to the operator, but it means excessive wear on all joints in the steering gear as well.

In Fig. 2 is shown the tools employed in the Studebaker repairshop, Chicago. For testing the alignment of the front wheels to see if they converge properly toward the front, the rod R is used. The left end of this rod, as it rests in the illustration, is bent at right angles to the main portion of the rod for about 1 inch of its length. The other end, as shown, is looped so that the rod can be hung on a nail driven into the wall or pillar of the shop. To use this rod, the operator simply places it in position as shown, hooking the bent end at the left behind the felloe of the farther wheel, then marking with his thumb the point opposite the outside the felloe of the near wheel. This measurement should be taken at a point as nearly the height of the hub of the wheel as possible. After measuring the distance at the front of the wheels, the rod is withdrawn and placed in a similar position at the back or behind the axle; or it might be better to measure behind the axle first, then it will not be necessary to move the thumb, for the front measurement should be less than that of the rear.

For Testing Vertical Alignment

The other tool shown in the illustration is a specially-designed square with a loop in its vertical arm to provide clearance for the wheel hubs. It is designed for the purpose of testing the vertical alignment of the wheels. To use it, one simply rests the longer arm of the square on the insides of the wheel felloes at their lowermost points as shown, then the fingers P and PI are adjusted so as to touch the sides of the felloes as indicated. The square next is removed, and the vertical arm arranged in the same position opposite the other wheel, if the fingers P and PI do not touch the sides of the felloe of the other wheel in the same way, it is evident that the wheels are not in alignment. Should both wheels be out of alignment, the proper angles may be obtained by adjusting the square on a new car of the same make and model, and then making the mis-aligned wheels line up accordingly, or the proper angle of alignment may be learned from the factory, of the maker.

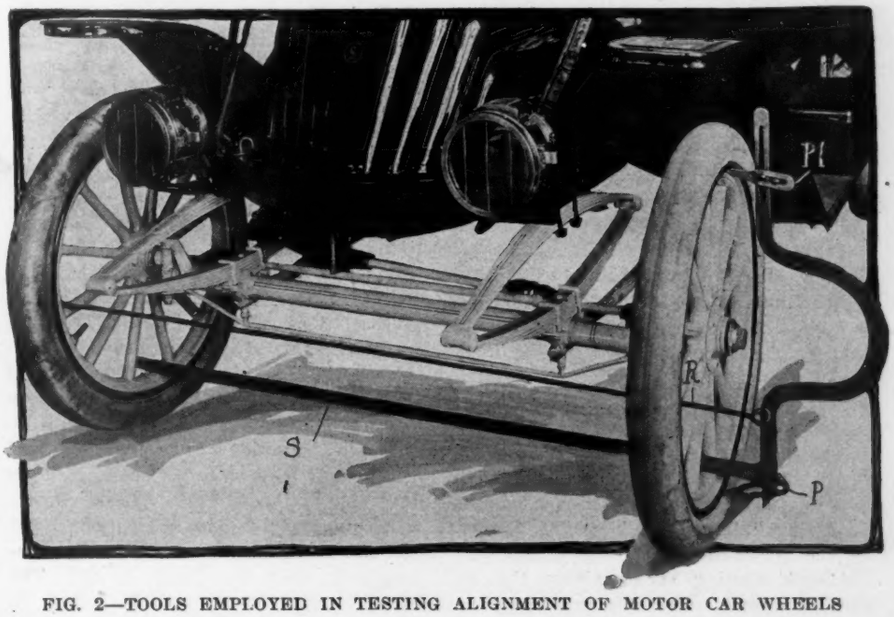


FIG. 2—TOOLS EMPLOYED IN TESTING ALIGNMENT OF MOTOR CAR WHEELS

Among the Makers and Dealers

NEW AMERICAN SCOUT MODEL, TYPE 22 A

PACKARD Truck Shipments—Shipments of Packard trucks for the first 3 weeks in March exceeded the best previous record for any one month.

Will Locate in St. Paul—The St. Paul Rim and Axle Co., $100,000 capital, is said to be seeking a factory site in the midway district at St. Paul, Minn., for a factory to manufacture a new detachable rim and a new axle. The factory will do drop forging.

Big Plant Nearly Ready—Announcement is made by the Continental Motor Mfg. Co. that its Detroit branch will be opened between April 1 and April 15. The establishment in Muskegon will be continued. When started the Detroit plant will be used first to produce 10,000 motors for the Hudson company.

Protecting Garagemen—Senator Beekman, of Newport, R. I., has presented a bill to the Rhode Island legislature that will be passed this session protecting the garage and stable keepers from people who hire vehicles and refuse to pay for them. It is patterned after the Bay State law and provides a punishment for any one who defrauds a garage or stable keeper by a fine of not exceeding $20 or imprisonment for 30 days.

Saybrook Week in Philadelphia—The United Motor Philadelphia Co. of 216 North Broad street, has inaugurated what is known as Saybrook week and is featuring the Stoddard-Dayton Saybrook model as representative of a new standard of value. As a part of the plan the salesroom has been transformed to represent a corner of a country estate showing a real Italian pergola on the knoll of a lawn. Surrounding it are specimens of spring foliage and blooming flowers. At the approach to the pergola is a new Saybrook touring car awaiting the return of a party from the gardens. The idea is credited to Gridley Adams, general advertising manager of the United States Motor Co.

Ready in Fall—The Durant-Dort Carriage Co.'s Flint motor wagon department will not be ready until late summer or early fall to take up the matter of agency appointments.

Maxwell Back at His Desk—Having entirely recovered his health after an illness of many months, J. D. Maxwell, president of the Maxwell-Briscoe Motor Co. and vice-president of the United States Motor Co., has returned to New York, where he will make his headquarters.

Needs More Members—The Tri-City Auto Dealers' Association is making a campaign for more members, the effort being to secure all of the dealers in the three cities, Davenport, Rock Island and Moline. The good roads and other campaigns which the new association plans to institute will not be begun until the roster is materially increased and will then be prosecuted in co-operation with the Davenport, Rock Island and Moline clubs and with the motor car factories of the tri-cities.

Bosch Factory May Move—There is a possibility that the Bosch Magneto Co. may move its plant to Bloomfield, N. J., and purchase the plant of the Simms Magneto Co. Charles M. Wild, general superintendent of the company, has inspected the Simms plant and has advised that it be purchased. President Otto Heins of the Bosch company is dissatisfied with the action of the state board of health that was recently petitioned to have the Springfield Rendering and Provision Co. moved from Brightwood and this has something to do with the contemplated move to New Jersey. The Bosch company will sell its plant in Springfield, Mass., and leave the city altogether if the contemplated deal goes through.

Velie Truck Plant Completed—The Velie Motor Vehicle Co. is now occupying its new truck factory at Twenty-fifth street, Moline, Ill., and from this time on all of the trucks will be manufactured there. The new factory represents an expenditure of $150,000.

Stevens Contract Let—The Stevens-Duryea Co. has let the contract for the new building that is to be erected on the 40-acre tract of land recently purchased by the company at East Springfield, Mass., and arrangements have been made with the railroads to run a spur track to the rear of the building.

Would Limit Oil Storage—An ordinance is about to be passed by the common council of Oshkosh, Wis., limiting the storage of oils. The proposed ordinance says: "Within the special limits of the city of Oshkosh, not to exceed twenty barrels of kerosene, carbon oil or lubricating oil may be stored at any one time."

Wants More Room—The Motor Specialties Co. of Waltham, Mass., has outgrown its present factory building on Whitney avenue and the officials of the company have been negotiating with the Newton and Watertown Gas Co. for the use of one of its buildings at present unoccupied and which would give the firm much more room.

Resent High Electricity Charges—Resenting the high price charged for electric current, garages in Bloomington, Ill., which charge electric car batteries are installing their own electric plants. The expense of installing a plant ranges from $1,000 to $1,500 and the saving in the cost of producing the current is estimated at 50 per cent, the plant in a short time paying for itself. Where formerly $2 to $2.50 was charged for charging an electric car, from 75 cents to $1 is now collected.

Lynn Garages Rates Increased—Beginning April 1 the motor dealers and garage owners of Lynn, Mass., propose to increase their rates for general storage of motor cars. An effort was made to get the Lynn Automobile Dealers' Association to make the rate standard throughout the city without effect. The proposed new schedule calls for $8 per month for a 25-horsepower car; $10 for 25 to 35 horsepower, and $12 per month for all above 35 horsepower. The Lynn Automobile Dealers' Association recently made an agreement on the handling of second-hand cars and there is a regular list price in vogue now so that any mem-

ber who violates the agreement loses membership in the association and forfeits $500.

New Grout Sales Manager—John O. Belcher has been appointed sales manager for the Grout Automobile Co., with headquarters at the factory at Orange, Mass.

Change in Truck Companies—A new company, known as the Westfield Motor Truck Co. of Westfield, Mass., has assumed the business of the P. H. P. Motor Truck Co., and it has also assumed a lease of the garage of A. B. Pendleton & Son on George street.

Regal Salesmen Meet—Representing every district in the United States except the extreme Pacific states, the traveling sales force of the Regal Motor Car Co. came together at Detroit for a joint session with the factory sales managers last week. Starting with an informal meeting in the factory offices on Monday afternoon, the conference continued with a banquet in the evening. On Tuesday the convention continued with two general sessions, trips through the factory and rides about the city in the company's cars.

Woodworth Treads Invade Europe—A. H. Hedinger, who was until recently Boston manager for the J-M Shock Absorber Co., has sailed for Europe to take charge of the business of the Leather Tire Goods Co. in continental Europe. Mr. Hedinger will carry a stock of Woodworth treads in London and will also have an office on the continent. Agencies for Woodworth treads will be established in all the larger towns and cities of Europe and it is also expected that a factory will be opened in the near future.

New U. S. Supervisors—The United States Motor Co. has added three new supervisors, whose duties involve the supervision of the branch houses and dealers in different parts of the country. Ernest H. Brandt will have charge of what is known as the New York district, including the branches and dealers under them, operated at New York, Albany, Syracuse and Buffalo, with offices at New York. Fred A. Harris will care for the middle district, having in charge the branches at Chicago, South Bend, New Castle, Indianapolis and St. Louis, with headquarters in Chicago. S. D. Porter is appointed for the western district, including the branches at Minneapolis, Kansas City, Des Moines, Omaha and Dallas, with headquarters at Kansas City. The New England territory and Boston branch are supervised by F. J. Tyler. W. F. Smith is in charge of the branches at Philadelphia, Wilmington, Trenton, Baltimore, Washington, Pittsburgh, Charlotte and Atlanta, with offices in Philadelphia. A. I. McLeod at Detroit will care for the central west and the branches at Cleveland, Toledo, Columbus and Detroit. A. B. Barkman has charge of the interests of the United States Motor Co. on the coast, including branches at Los Angeles and San Francisco.

Death of W. H. Gibson—W. H. Gibson, advertising representative of Horseless Age in the middle west, dropped dead from heart disease last Thursday at his home in Wilmette, a Chicago suburb.

McKee Advertising Manager—A reorganization of the advertising force of the Henderson Motor Sales Co. has taken place in Indianapolis since the recent resignation of Lucius S. French, advertising manager. Homer McKee has become advertising director, while H. C. Bradfield has taken charge of all of the newspaper advertising.

Wayne Davis Out—W. Wayne Davis, one of the best known men connected with the Philadelphia trade, has withdrawn from the W. Wayne Davis Co., Everitt agent, 600-602 North Broad street, Philadelphia. Mr. Davis has been actively identified with the motor car industry from its infancy, having previous to his connection with the Everitt agency handled the Packard and Matheson cars.

Self-Starter Concern Growing—Articles will be filed in a few days with the secretary of state at Lansing, Mich., increasing the capital stock of the Invincible Starter Co., of Detroit, to $25,000. The new officers of the company are: Edward J. Corbett, president; D. W. Reinohl, vice-president; George S. Anderson, treasurer, and H. J. Weeks, secretary and general manager. The directors are Edward J. Corbett, D. W. Reinohl, Walter E. Oxtoby and George F. Monaghan. The Invincible Starter Co. is engaged in manufacturing the Invincible acetylene self-starter. At present the plant is turning out from seventy-five to 100 starters daily.

Enlarging Pope Plant—A new building is to be erected at Hartford, Conn., by the Pope Mfg. Co. that will give the company 60,000 additional square feet of floor space. It is to be four stories and will adjoin the superintendent's building. The company has just disposed to Boston and New York financiers a note for $1,000,000 to run 2 years.

The New American Scout—The American Motors Co. of Indianapolis has placed on the market a new model of the American Scout type which will be known as 22A, which will list under $1,500. It has a wheelbase of 105 inches, and the motor is of the long stroke, T-head type with a stroke of 5 inches and bore of 3¾ inches. The wheels are 36-inch.

Fifty Windows in Garage—Charles Karr, a business man of Bakersfield, Cal., believes in daylight illumination in preference to artificial, so when he constructed his new garage and salesrooms, where he will display the Studebaker Corporation's products, he provided for fifty windows in his establishment. The latter is the largest of its kind fringing the great California desert.

Packard's Foreign Representation—Sale & Frazar Ltd., a large firm of importers located in Tokyo, have taken over the Packard account for Japan, Korea and Manchuria. Sale & Frazar have a big establishment in Tokyo. They handle American locomotives and the products of the United States Steel Corporation. They maintain a large machine shop and in addition to handling cars will carry in stock a complete supply of extra parts.

DECORATIONS IN UNITED STATES MOTOR CO., PHILADELPHIA BRANCH, DURING SAYBROOK WEEK

Development Briefs

New Mechanical Engine-Starter—Coil Spring Keeps Car Going Straight—Pneumatic Speedometer—Rhoades Unit Spark Ignition System—Breech-Block Plugs—Cleary Tire Pumps—Induction Coil Plug

Pneumatic Speedometer

A DEVELOPMENT of the Troy pneumatic efficiency indicator described in a recent number of Motor Age is a speedometer and odometer operated by compressed air. This is a product of the Troy Carriage Sunshade Co. At the left of Fig. 1 is shown the operating machanism connected to the wheel. This consists of a rotary pressure generator which may be described as a rotary pump, except that it does not draw air from the outside and then eject it through a vent. It simply causes the air to rotate within its own body, forcing it again and again through a small aperture. The faster the air is required to pass through this aperture the greater the back-pressure; and this back pressure is communicated to the indicator through the tube. Within the indicator a diaphragm is thus caused to rise, and the needle responds in the proper ratio so as to give the proper reading.

The rotary head as it turns handles a definite measured volume of air within itself. When the speed of the car is low the rotation of the rotary head is low, and the air passes through the bypass with scarcely any resistance. But as the velocity increases the speed of the rotary head increases and the volume of air handled increases. In other words, the pressure necessary to pass this increased volume of air through the aperture, or bypass, increases in accordance with the law pertaining to the forcing of gases through an aperture of constant size. The pressure necessary to force gas through an aperture of a given size in a given time increases in proportion to the square of the volume of the gas. The size of the by-pass, or aperture, can be regulated to suit the size of the wheel. As the hand is impelled by pneumatic force, which gives it a cushion upon which to rest, oscillation, it is claimed, is done away with.

For operating the odometer a separate generator produces a pulsatory air column through the tubular connection. These pulsations are actuated by a diaphragm in the generator, which causes a column of air to flow through the tube first in one direction and then in the opposite direction. The air is then driven forward in the first place and then sucked back, repeating this over and over with the motion of the wheel of the car. These pulsations are responded to

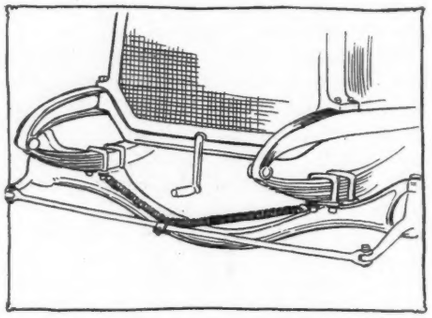


FIG. 2—THE LITTLE STEERSMAN

by a diaphragm in the indicator of the odometer system, and as this diaphragm in the indicator rises and falls it causes the counting wheels in the indicator to revolve, registering the mileage traveled.

Simplex Self-Starter

A new mechanical device for rotating the motor and which has in connection with it a priming pump for putting gas in the cylinders so that it will be unnecessary to spin the motor, is called the Simplex self-starter, made by the Simplex Mfg. Co., Anderson, Ind. The mechanical device for turning the motor over is illustrated in Fig. 3. The apparatus employed for rotating the motor consists of 7 pieces assembled on a bushing mounted on the main shaft between the clutch and gearset or on the crankshaft in front of the motor. The device is operated by means of a foot pedal connected by cranks to a pawl so that by forward motion of the foot pedal the pawl engages in a ratchet and rotates the motor. In case of a back-fire another pawl engages in notches on a stationary disk and throws the first one out of engagement, allowing the motor to rotate backwards freely. Working in conjunction with the starter is a small hand priming pump which draws gasoline from the main supply line into four cylindrical chambers ready to be forced into the cylinders of the motor. With a downward stroke of the pump four pistons working in the cylindrical chambers spray the gasoline in equal proportion into four cylinders. After the cylinders have been primed, the motor is then started by the foot pedal. If for any reason the motor does not start the first time over, it can be turned as many times as necessary by the foot pedal. In extreme cold weather after the motor is started it can be kept running by feeding gasoline through the priming pump until it warms up sufficiently for the carbureter to take hold. The device can be installed on almost any car without much machine work.

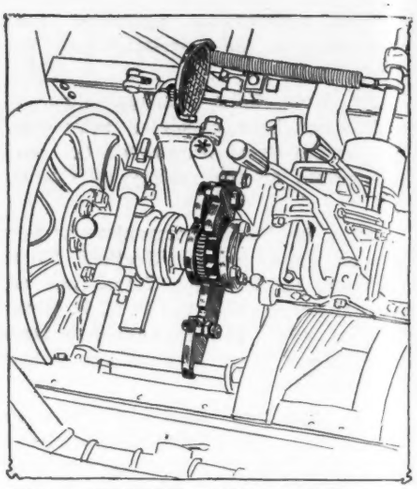


FIG. 3—SIMPLEX MOTOR STARTER

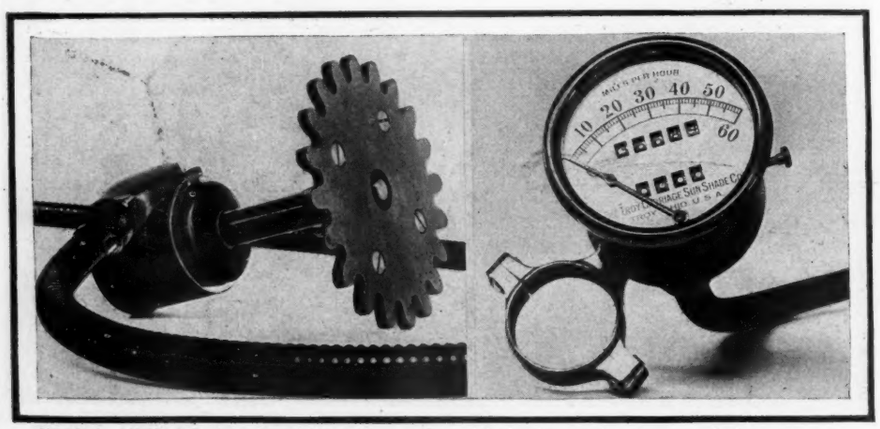


FIG. 1—DIAL AND MOTOR OF PNEUMATIC SPEEDOMETER

Rhoades' Unit Spark System

A new ignition device operated by battery is called the Rhoades unit-spark system and is manufactured by the New York Coil Co., New York. Its purpose is to provide a battery jump-spark system that will deliver a very hot igniting spark accurately timed and of an unvarying intensity independent of engine speed. This system consists of three separate parts, the patented circuit operating mechanism which determines the time the spark is to be produced, the distributer, which forms a part of this same instrument for the purpose of distributing high-tension current to the

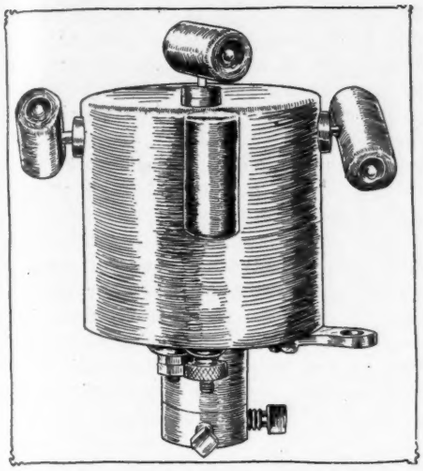


FIG. 4—RHODES CIRCUIT BREAKER

proper cylinder, and a non-vibrating coil, or more properly, a transformer, with which is provided a button for starting the engine on the spark. The circuit controlling mechanism is of most simple form, at the same time representing a new and ingenious mechanical movement.

This circuit controller is illustrated in Fig. 4 and Fig. 8. The latter shows the device with the cover removed. Contact is made and broken between the platinum point on the inner end of the adjusting screw at the left and the corresponding platinum point on the spring; normally these contacts are apart. The triangular pivot piece, or trigger, on the central shaft is tipped by the teeth on the revolving ring. There is one of these teeth for each cylinder. The upper end of the trigger lifts the notched disk immediately above it against the action of the coil spring, and at the same time this disk is made to revolve by its attachment to the shaft. As the disk snaps back into position from which it had been raised by the trigger, one of the projections on the disk engages on the lip formed on the circuit breaking lever to which is also attached the contact spring. As the disk snaps by the lip it forces the contacts to touch each other momentarily, thus closing the circuit from the battery through the transformer and holding it closed just long enough for the coil to build up, when they are instantly separated, breaking the circuit and producing the spark from the secondary of the transformer. The trigger is so formed that backward rotation of the engine does not raise the disk so that no contact is made in the reverse direction nor can it stop in contact under any circumstances. The upper portion on the end of the central shaft is the distributor, the secondary current passing into it through a pressed contact carried on top, not shown.

The high-tension terminals provided with each instrument are unique and are illustrated in Fig. 4. These are free to turn and thus remove any strain from the wire when the housing is moved for advancing or retarding spark. In attaching these to the secondary cable, connection is made

Novelties for Motoring

Transforms Oil and Gas Lamps to Electric—Simple Lighting Switch—B & S Master Vibrator—Autographic Daily Speed Record for Commercial Cars—Splitdorflite Magneto Lighting Generator

by simply screwing the cable into them. They may be detached by simply pulling them away from the instrument as they are held in position by a spring.

The Little Steersman

To prevent the front wheels from being turned aside by obstructions or unevenness in the road there has been developed by the Modern Auto Appliance Co., Chatham, N. Y., a device called the Little Steersman. It consists of a helical frame about 3 feet in length made from specially-prepared oil-tempered steel wire with center clips and end attachments made from steel forgings. It is designed to be attached

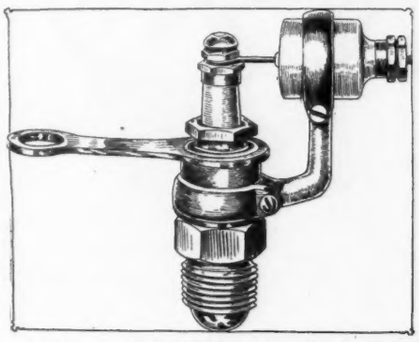


FIG. 5—BREECH-BLOCK PLUG WITH EXTRA SPARK GAP

between the front spring seats and the steering rod to correct automatically any tendency of the wheels to turn aside from a straight path. It can be installed on any car in a very few minutes. The device and its installation are illustrated in Fig. 2 on the opposite page.

Electric Lamp Converters

The Narragansett Chemical Co., Providence, R. I., in connection with its Meteor storage batteries for car lighting, is marketing adapters for converting gas and oil lamps into electric lamps. The adapter for use with the acetylene headlights is illustrated at the left of Fig. 6 and consists of a parabolic reflector for each lamp equipped with a 16-candlepower tungsten bulb and has a standard which slips over and locks on the acetylene burner post. It is arranged to be quickly dismounted if it is desired to use acetylene. An adapter for oil lamps is illustrated at the right of the cut and merely clamps around the lamp burner and holds a 4-candlepower tungsten bulb arranged to be tilted back if it is desired to use oil.

B & S Lighting Switch

In Fig. 11 is illustrated a new switch for controlling the electric lights on motor cars. It will be noticed that it has five different points, the connections of which are obtained by simply turning the knurled knob to the desired point. The positions given are first, the off position; second, lighting the left side and tail lamps; third, both side lamps and tail lamp; fourth, all the lamps, that is headlight, side lights and tail light; and fifth, headlight and tail light alone. The plunger contacts which have been distinctive of Briggs & Stratton construction for some time are employed in these switches. The different positions are noted by positive stops and it is not necessary to look at the switch when operating it. A kick lighting switch, giving four-point control, is another addition to this line. This is said to be the only kick lighting switch that provides for lighting the gauge lamp. This can be done by placing the foot on the switch lever and pressing in. The wiring diagram for this switch is illustrated in Fig. 13.

A master vibrator for correcting the timing of multiple cylinder spark plugs is illustrated with its wiring connections in Fig. 9. This is made by Briggs & Strat-

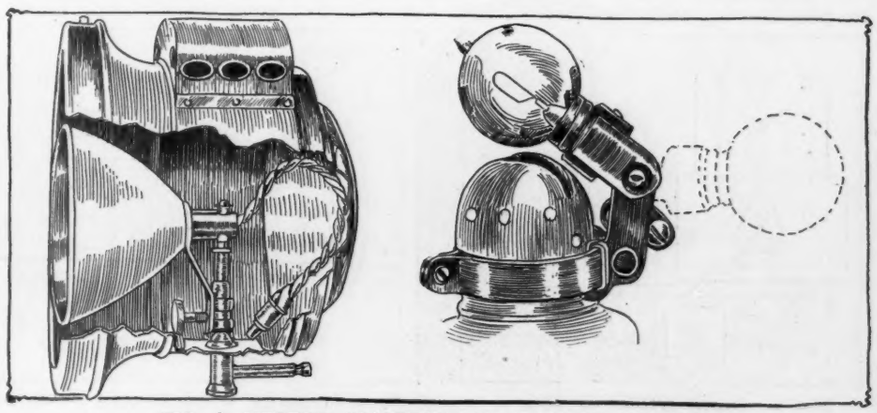


FIG. 6—METEOR ADAPTERS FOR ELECTRIC LIGHTING

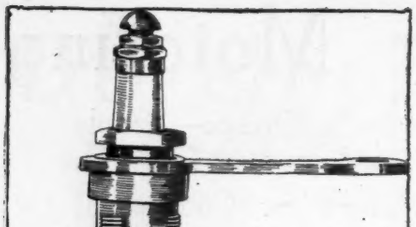


FIG. 7—SPIT-FIRE BREECH-BLOCK PLUG

ton Co., Milwaukee, Wis. One of the chief claims made for this construction is that no wax is used in insulating the coils; instead, a heat, water and insulating compound is forced into the windings after a vacuum has been produced in them. The impregnating of the windings with the insulating solution in this way adds practically nothing to the original size of the coil so that the size of the instrument as a whole is unusually small. A plug transformer coil made by the same company is illustrated in Fig. 16.

Breech-Block Plugs

The Spit-fire spark plug has appeared in a novel form by which it is quickly demountable. The plug besides possessing all the qualities of the ordinary Spit-fire has additional feature that it can be separated for inspection, the soot removed, and the core replaced in the engine without even stopping the motor. This is accomplished by sectional threads which may be locked into position or unlocked and removed by a single turn of the plug. To facilitate this there is attached a handle or wrench so that the operation is as simple as throwing the breech lock of a rifle. The base of the plug is permanently fixed in the engine and affords an easily accessible priming cup. This is the product of A. R. Mosler, New York, and is illustrated in Fig. 7. An addition to this type of plug as illustrated in Fig. 5 is the adjustable spark gap. The attachment can be clamped to the neck of the plug as a terminal for the regular spark wire. An adjustable point clamps the top nut and can be made to touch the terminal or slightly withdrawn to give permanent spark gap.

Cross Speed Recorder

The latest autographic speed record for motor cars is based on the time-tried principle of the fly-ball governor. The recorder is designed by V. L. Cross of St. Albans, Vt., and is illustrated in Fig. 14. The indicator is designed to automatically record the number and time of stops, speed between stops and time lost between stops. A paper dial or record disk is rotated by clockwork so it gives a complete revolution in 24 hours, when it may be removed and replaced by another record. Upon this dial, an arm swinging in proportion to the rate of speed traces an ink line so that an automatic autographic record is obtained each 24 hours. The swinging arm is operated through a bell crank attached to a sleeve which forms the upper collar of a fly-ball governor operating in oil. The governor, in turn, is rotated by a flexible shaft from the wheel just as any speedometer is operated. An increase in speed will cause the balls of the governor to fly out, drawing down the sleeve and throwing the recording pin outward toward the periphery of the record disk. In this way a permanent record of the car's daily history may be obtained. The dial of course is graduated for miles per hour and also carries around its circumference graduations corresponding to the time of day. An arrow is fitted on the recorder case which points to the exact time of day so that the disk acts as a clock as well. Such an instrument should prove valuable for use on commercial cars where the manager of the service department must needs keep track of the movements of his vehicles.

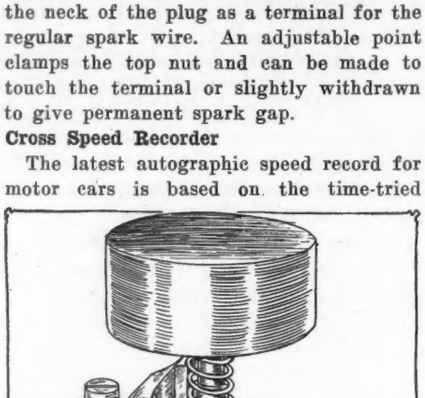


FIG. 8—MECHANISM OF RHODES CIRCUIT CONTROLLER

Worm-Driven Air Pump

An air compressor for providing air under pressure for tire inflation or for pneumatic starters has been brought out in novel form by M. P. Cleary, Beaver Falls, Pa. This is illustrated in Fig. 10. This is a double-acting plunger pump driven by a worm and gear from a shaft which is in turn driven by friction or gearing from the transmission shaft. The pump is a single casting, and suction and discharge valves are of the dome shape often seen on pumps of larger capacity. The capacity of the pump is 120 cubic inches of air per minute at a speed of 120 revolutions per minute, and it is claimed that it will inflate a tire in from 2 to 2½ minutes. The dimensions of the pump are: length, 12 inches; height, 3⅜ inches; width, 3⅜ inches. The cylinders have 2-inch bore and stroke.

Splitdorf Lighting System

Splitdorflite is the name of a new electric lighting generator of Splitdorf construction illustrated in Fig. 15. The generator is of the magneto type, permanent magnets similar to those employed in the type B Splitdorf magneto being employed. The field is strengthened by the addition of an electromagnetic compound-wound field. Within the cover of the generator is an electromagnetic device which automatically connects and disconnects the generator to or from the lighting line in accordance with the terminal voltage of the generator. The regulating device is

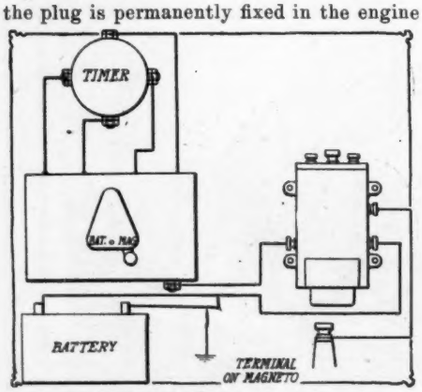


FIG. 9—CONNECTIONS OF B. & S. MASTER VIBRATOR

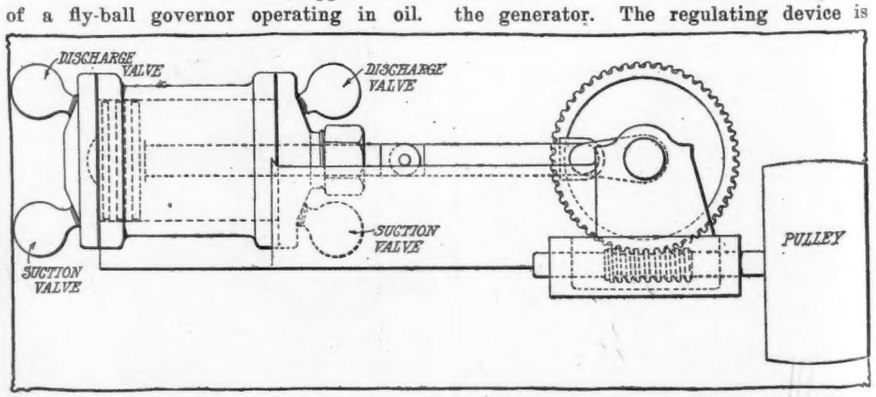


FIG. 10—CLEARY WORM-DRIVEN TIRE PUMP, DESIGNED TO PROVIDE AIR UNDER PRESSURE FOR PNEUMATIC STARTERS OR TIRE INFLATION

adjusted to close when the generator voltage rises to 6½ volts. In the small generator, for lighting alone, the contacts close at 800 revolutions per minute, while in the larger generator intended for both lighting and ignition the generator is cut in at 600 revolutions per minute. The opening and closing of the contacts is said to be practically sparkless because at that voltage the pressure of the battery and that of the generator are equal and opposite. The method of connecting the combination generator for lighting and ignition is illustrated in Fig. 12. The Splitdorf lighting outfit consists of a generator, fuse box and special ammeter, and the combination outfit consists of a larger generator with a distributor, a fuse box, ammeter and switch and a non-vibrating coil having a special winding to prevent injury if the switch is left on over night.

Reason Puncture-Proof Tube

W. M. Reason, Pontiac, Mich., has developed a tube for pneumatic tires which he claims to be puncture-proof and free from danger of blowouts. It is a patent process by which the tube is made and details of method and materials are not available. The walls of this tube are slightly thicker than the walls of those in general use but it is stated that the special material from which the tube is made gives it its non-puncturing and non-blowout qualities. Though the weight of the tube is a little more than that of the ordinary rubber tube, its flexibility is said to be equal to if not greater than that of any pneumatics now in use.

Metalite Carbon Remover

The Marshall Oil Co., of Marshalltown, Iowa, is producing a remover of carbon deposit under the name of Metalite. This preparation is in the form of cubes about ⅛ of an inch on a side which are intended to be poured into the cylinder. Metalite is said to be a soft, combustible metallic compound, and as it is very heavy, the rapid action of the motor enables it to beat the carbon off the piston and cylinder walls. The loosened carbon is blown out of the exhaust valve with the explosion of the burned gases. The cubes are combustible and ignite so that they are consumed shortly after they have done their work and then pass out through the exhaust valve in the form of a gas, it is claimed. It is stated that the cubes are so small that they cannot interfere with the clearance of the valves or the motor but in case the cubes do pass through the intake valves, the carbureter should be removed and emptied after all of the cylinders have been cleaned. The combustion of the small pieces of Metalite in the explosion chamber prevents their getting under the piston rings or passing the piston. It is stated even that the heavy gas emitted by the burning metalite acts upon the gummy substance holding the carbon to the metallic surfaces of the motor in such a way that the carbon crumbles and is blown out. In operation a small quantity is put into one cylinder at a time, the motor run for 2 minutes to half an hour when the next cylinder may be treated in the same way. This may be done upon the road.

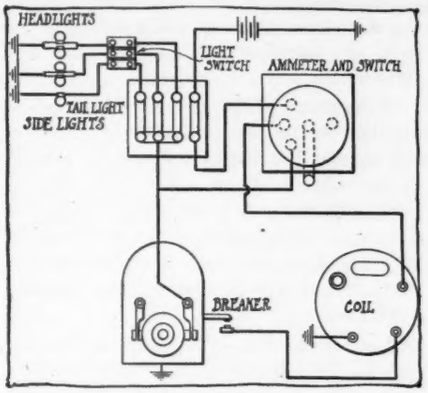


FIG. 12—WIRING OF SPLITDORFLITE COMBINATION SYSTEM

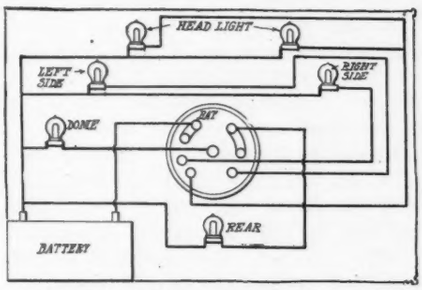


FIG. 13—CONNECTIONS OF B. & S. FIVE-POINT SWITCH

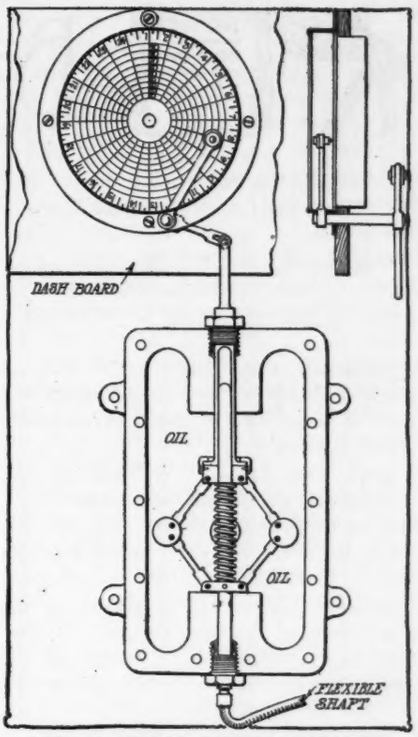


FIG. 14—CROSS SPEED RECORDER

Time-Saver Repair Kit.

The tire repair kit put up in form for storing away in the car to be available for roadside repairs has been brought out by the Auto Time-Saver Repair Kit Co., Boston, Mass. The kit consists of a wire spreader, a screw rubber cutter, a pair of pliers for attaching repair plugs and a dozen rubber plugs for repairing injuries to tires. The plugs are constructed of solid rubber having a pliable metal skeleton and, when compressed, the plugs are said to have ten times the tensile strength necessary to close the puncture. As the metal is imbedded in solid rubber injury to the tire is avoided. It is claimed that punctures can be repaired permanently in less than 60 seconds.

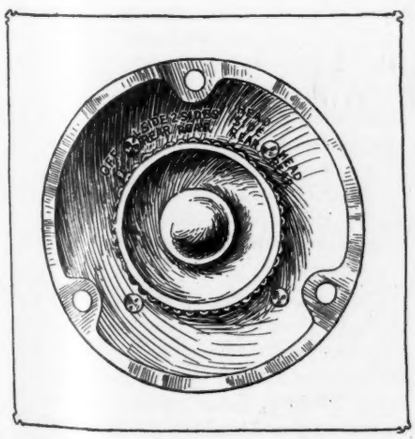


FIG. 11—B. & S. LIGHTING SWITCH

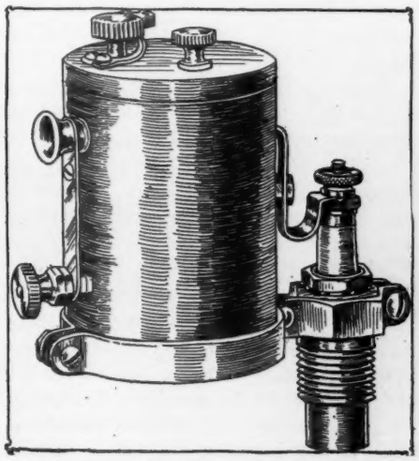


FIG. 16—PLUG TRANSFORMER COIL

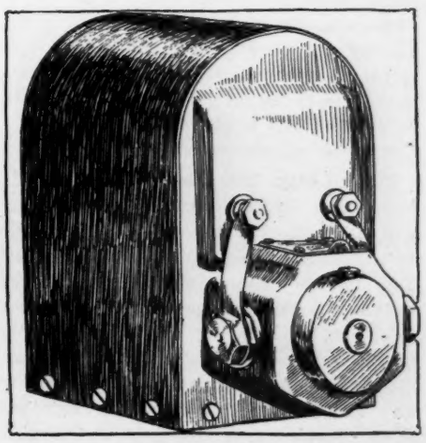


FIG. 15—SPLITDORFLITE GENERATOR

Brief Business Announcements

CLEVELAND, O.—James Fintze has joined the forces of the D. E. Foote Rubber Co.

Binghamton, N. Y.—The New York Sales Co., Cole representative, has moved from 192 Water street to 25 Washington street.

Oklahoma City, Okla.—The Berg & Bengston Machine Works and General Motor Car Repairing Co. has removed to 605 North Hudson street.

Iowa Falls, Ia.—W. G. Gohring has bought out his partner's interest in the firm of Gohring & Babcock and will continue to sell Cole cars under his own name.

Denver, Colo.—C. D. Hutchens, of the sales force of the Case company in Denver, has been placed in charge of the new salesroom which the firm has opened at 1236 Broadway.

Eau Claire, Wis.—F. E. Hall has organized the Eau Claire Vulcanizing Co. in company with E. L. Moffit and B. F. Headley and will establish a large tire repair plant and agency. The company has been incorporated with $2,000 capital stock.

St. Louis, Mo.—Two new supply houses have opened quarters in St. Louis. They are the Holzman Auto Supply Co., which has for its officers members of the National Auto Supply Co., of New York, and the Jenkins National Auto Goods Co., a branch of the Jenkins Auto Supply Co., of Sumter, S. C.

Atlanta, Ga.—C. W. Martin, Jr., for some time southern district manager for the Goodyear Tire and Rubber Co. with headquarters at Atlanta, has been appointed manager of the company's motor truck department. Mr. Martin has been transferred from Atlanta to the general offices at Akron.

Indianapolis, Ind.—A $9,000 garage is being built by the Standard Oil Co. in Indianapolis, the company contemplating displacing its horse-drawn equipment with motor equipment in this city. The new garage is to be 38 by 125 feet and will be of steel and brick construction, with a reinforced concrete roof.

Kansas City, Mo.—Heretofore the Ohio Motor Car Co., of Cincinnati, was represented in the Kansas City territory by Jasper Ewing Brady as district manager. This territory has now been taken over by the recently incorporated Ohio Motor Sales Co., of Missouri, which will handle the Ohio car exclusively in the territory mentioned. Arrangements are now under way for the erection of a new building to be occupied as a salesroom and service station. Mr. Brady has been transferred to the Chicago territory as district manager for the middle west territory, with headquarters in Chicago.

Cincinnati, O.—The United States Tire Co. has removed from Main street to its new and commodious quarters at 1121 Race street.

Milwaukee, Wis.—A. Weisskopf, state distributor for the O'Neil tire protector, has opened salesrooms and service station at 188 Eighth street.

Chagrin Falls, O.—The Falls Garage Co. will open a garage and sales agency on Washington street, near the Electric Depot. It will handle the E-M-F, Flanders and Metz.

Milwaukee, Wis.—The Chemical Rubber Co., an Illinois corporation with $150,000 capital, has filed articles and a statement to do business in Wisconsin. The local interest is given as $5,000.

Boston, Mass.—The Cartercar agency, handled in Boston by Williams Brothers, has been moved from 521 Dudley street, Roxbury district, to 1000 Boylston street, in the center of the motor colony.

Beaver Dam, Wis.—J. G. Beck, Alvin Beck and Rudolph Beck, of Milwaukee, have organized the Beaver Dam Auto Co. and will open a garage here on April 1. The concern will represent the Elmore and Hupmobile in this territory.

Tacoma, Wash.—R. P. LeFeber, district manager for J. T. Keena & Co., northwest Packard representatives, has left their employ in Tacoma to take charge of the new Winton factory branch opened at Vancouver, B. C. M. M. Keena will hereafter have charge of the Packard branch in Tacoma.

Philadelphia, Pa.—The Steckel Motor Truck Co. has opened a salesroom at 1414 Ridge avenue, near Broad street, and has made arrangements to act as distributing agent for eastern Pennsylvania and southern New Jersey for the Motor Conveyance Co., of Milwaukee, on B. O. E. motor trucks.

Philadelphia, Pa.—The E. R. Thomas Motor Car Co., of Buffalo, has appointed Grantley P. Postles, local agent of the Thomas car. Mr. Postles' territory embraces Philadelphia, southern New Jersey and Delaware. The temporary salesroom and service department are located at 2035 Market street.

Charles City, Ia.—C. C. Hicks has disposed of the business which he operated under the firm name of Hicks Automobile Co., and is devoting all his time to the new firm of the Hawkeye Vulcanizing Co., Charles City, Ia. The last named concern is not incorporated, but is a partnership affair between C. C. Hicks and T. C. Hines, and does nothing but tire repairing.

Barberton, O.—Clyde O. Rasor is a recent addition to the motor colony and now is seeking a car agency.

York, Pa.—John Y. Burgard, 551 West Market street, will handle the Reo, Crawford, Overland and Oakland cars in this city during this season.

Des Moines, Ia.—The Des Moines Rambler Co. will open a garage here April 1 to handle Rambler cars. Earl Scripps and Given Chase constitute the new firm.

Bridgeport, Conn.—The Locomobile Co. of America is having completed a large frame building that will be used by the company as a time office. It will be finished early this summer.

Portland, Ore.—E. N. Howe, who was connected with the White Motor Car Co., of Portland, for some time, has accepted the position of sales manager with the Michigan Motors Co. of this city.

Denver, Colo.—A garage costing $30,000 and having a frontage of 75 feet will be erected at Twelfth and Broadway this spring. D. Carson Fleming, of the firm of prominent South Denver bankers, is at the head of the project.

Akron, O.—Chester M. McCreery, formerly a newspaper man, who has been with the Goodyear Tire and Rubber Co. for a year, has been made manager of the Boston branch of that company, which is the third largest in the United States.

Pittsburgh, Pa.—The garage of the Oakland Automobile Co. in Forbes street was entirely destroyed by fire last week, sixteen cars also being destroyed. The loss is about $40,000. The fire was caused by gasoline igniting from an overheated coal stove.

San Francisco, Cal.—Henry L. Hornberger, branch manager of the Oakland Motor Car Co., is the latest factory representative to locate in San Francisco, which will be the wholesale distributing point for the coast, western Nevada and Arizona.

Philadelphia, Pa.—V. H. Steckel, of the Steckel Motor Truck Co., Philadelphia, has been appointed distributing agent of eastern Pennsylvania and southern New Jersey by the Lincoln Motor Car Works, of Chicago, covering its line of light delivery wagons.

Hartford, Conn.—The Connecticut headquarters for the Atterbury truck are now located in this city, the main office and service station having been removed from Meriden. The company is to be known as the Atterbury Motor Truck Co. of Connecticut. Edward J. Ives is the

manager. Sub-agencies will be opened in New London, New Haven and Waterbury.

Toledo, O.—The Schacht Motor Car Agency is now located in its new quarters at 809 Jefferson avenue.

Quincy, Ill.—The Fischer Motor Car Co. purchased another garage at 422 Jersey street. The Oldsmobile has been added to the line.

Marinette, Wis.—Andrew Heim has rebuilt his painting and trimming shop, destroyed by fire recently. He will specialize in motor car work.

Minneapolis, Minn.—The Speed Punctureless Tire Co. has been organized in Minneapolis by W. H. Shafer and E. D. Mooar, of Minneapolis, and J. P. Ernster, Brainerd.

Plymouth, Pa.—The S. Reese Machine and Tool Works, of Plymouth, has closed a contract with the Lincoln Motor Car Works, of Chicago, as distributing agent for Wilkes-Barre and vicinity for the Lincoln light delivery wagons.

Milwaukee, Wis.—The W. E. Allen Co. has been organized by W. E. Allen, a prominent lumberman of Milwaukee, to represent the Marion in Wisconsin. The offices are at 1203 Majestic building and showrooms at 2807 Wells street.

Fond du Lac, Wis.—The Anderson Vehicle Co. will remodel its large garage at 38-40 West Second street and build an addition. The present building is 55 by 105 feet. The company represents the Cole, Brush and Paterson and deals in supplies and accessories.

Indianapolis, Ind.—The Indiana agency for Baker electrics, which has been held by K. W. Brewer, has been taken over by E. R. Vincent and D. F. Holliday, and the agency has been moved from North Capitol avenue to the White Motor Co.'s salesrooms in North Delaware street. The Fisher-Gibson Co. has closed the Indianapolis and state agency for the Stutz.

Houston, Tex.—Nye Ryman has purchased a half interest in the Bay City Auto Co. and is now in charge.

Moline, Ill.—L. E. Nutt, formerly with the Velie carriage works, has been appointed general purchasing agent for the Velie Motor Vehicle Co.

Columbus, O.—O. G. Roberts & Co. have not taken on the Rambler as recently announced. Their line is made up of the Overland, Marmon, Stearns, Garford and Ohio electric.

Orange, Mass.—Fred W. Belcher, the race driver, has joined the Grout Automobile Co. as its superintendent and mechanical engineer, with headquarters at the factory at Orange, Mass.

Chicago—Fire in the establishment of the Grand Boulevard Garage Co., Forty-third street and Grand boulevard, Friday afternoon destroyed twenty-seven cars. The loss on the building and stock is estimated at $100,000.

Watertown, Wis.—G. H. Hafemeister has incorporated his motor car business under the style of G. H. Hafemeister Motor Co., with a capital stock of $10,000. R. F. Hafemeister and W. M. Wegeman are associated with him.

Tacoma, Wash.—J. B. Baldy, long connected with the St. Helens avenue garage, has hung out his sign with four lines of cars painted upon it — Stevens-Duryea, Maxwell, Cole and Brush, and will be located at 902 Tacoma avenue.

Shreveport, La.—A general motor transfer company has been formed under the direction of J. H. Orme. The company in addition to installing trucks for transfer work will operate taxicabs. The company is capitalized at $35,000. J. H. Orme is president of the company; H. C. Brewster, vice-president, and H. S. Edwards, secretary.

Kokomo, Ind.—The Kokomo Auto and Machine Co., Cole agent, has changed its name to C. F. Seaward & Son.

Wausau, Wis.—Morgan Brothers are converting the local skating rink into a garage which contains 10,000 square feet of floor space.

Rochester, N. Y.—Le Hardy & Lindsay, Marmon dealers, formerly at 1189 University avenue, have moved to 308-310 East avenue, near Union street.

San Francisco, Cal.—J. F. Toole has recently taken charge of the F. B. Stearns Co. in San Francisco and will have the western territory formerly in charge of A. S. Holden.

Los Angeles, Cal.—Harvey Herrick has been appointed the Pacific coast representative for the Case and will have the appointing of agents and the handling of this car in California, with headquarters at Los Angeles.

Milwaukee, Wis.—Eugene R. Johnston, for many years manager of the Milwaukee branch of the Smith-Premier Typewriter Co., has accepted the management of the Milwaukee branch of the Studebaker Corporation.

Antigo, Wis.—D. W. Phillips, gas engine designer for the Harder Auto Truck Co., of Chicago, has accepted the position of chief designer for the International Hoist Co., of Antigo, Wis. He will have full charge of the gasoline engine manufacturing department.

Mt. Prospect, N. H.—If present plans go through next summer will seen a garage on top of Mt. Prospect, a part of the White Mountain range. A two-story structure, combining a garage and servants' quarters, together with a tower 33 feet high, to be used as an observatory, are

New Agencies Appointed by Passenger Car Manufacturers

Town	Agent	Make of Car
Aberdeen, S. D.	Charles E. Barkl	Cole
Alexis, Ill.	McKelvey & Clark	Moline
Alberta, Can.	D. G. Latta	Velie
Auburn, N. Y.	George Leonard	Cole
Audubon, Ia.	E. B. Elliott	Cole
Baltimore, Md.	Everitt Auto Co. of Baltimore	Everitt
Barberton, O.	C. H. Schubert	Cole
Boston, Mass.	John E. Worrill	Staver
Bosco, La.	J. C. Linxwiler	Oakland
Chicago	Dann, Dodge & Co	Cutting
Custer, S. D.	William M. Lovett	Moline
Cincinnati, O.	Cole Motor Sales Co	Cole
Davenport, Wash.	Jensen & Phillips	Overland
Dixie, La.	J. M. Sentell	Metz
Dexter, Me.	E. D. Blaisdell	Cole
Duluth, Minn.	Johnson Motor Car Co	Cole
Eau Claire, Wis.	A. L. Redmond	Rambler
Eau Claire, Wis.	A. L. Redmond	Reo
Eau Claire, Wis.	A. L. Redmond	Ford
Eveleth, Minn.	J. H. Brown, Eveleth Auto & Rpr. Co.	Cole
Fort Fairfield, Me.	Arthur P. Libby	Cole
Galion, O.	Clarence Dice	Flanders
Geneseo, Ill.	J. L. Lamont	Moline
Great Falls, Mont.	George D. Prentice	Everitt
Haverstraw, N. Y.	John W. Gillies	Franklin
Homer, La.	W. C. Price, Jr	Krit
Napa, Cal.	H. C. Dunlap	Cole
Hamilton, Ont.	Patterson Motor Sales Co	Cole
Helsingfors, Findl'd	George D. Holm & Co	Everitt
Jerusalem, O.	Brown & Wiley Co	E-M-F and Flanders
Kansas City, Mo.	Holmes & Howe	Stearns
Kankakee, Ill.	Fleming & Brown	Cole
Kalamazoo, Mich.	J. H. Penniman	Cole
Milwaukee, Wis.	Hustis Brothers	Stevens-Duryea
McConnelsville, O.	Morgan County Garage Co	Ford
Milwaukee, Wis.	Motor Service Co	Courier-Clermont
Montgomery, Ala.	Z. C. McIntyre	Cole
Martins Ferry, O.	Ernest K. Hoge	Cole
Newark, O.	T. H. Foos	Overland
Omaha, Neb.	Freeland Auto Co	Moline
Oakland, Ia.	E. E. Freeman	Cole
Ogdensburg, N. Y.	Crescent Garage Co	Cole
Oneida, N. Y.	Loyd's Garage	Cole
Oregon City, Ore.	G. E. Sullivan	Cole
Portsmouth, N. H.	W. K. Patterson	Kisselkar
Portland, Ore.	Frank C. Riggs	Detroit
Rosalie, Wash.	Meull & Helmer	Mitchell
Rock Island, Ill.	Horst & Strieter Auto Co	Ford
Rochester, N. Y.	C. J. Beardsley Brothers	Havers
Rapid City, S. D.	R. L. Holcomb	Cole
St. Louis, Mo.	Ordelheide-Leek Auto Co	Penn
Spearfish, S. D.	C. J. Cooney	Moline
Sibley, La.	W. R. Perritt	Krit
Seattle, Wash.	Stearns Auto Co	Everitt
Sheridan, Wyo.	E. F. Tisch	Maxwell
Sheridan, Wyo.	E. F. Tisch	Columbia
Sibley, Ia.	W. F. Peterson	Cole
Storm Lake, Ia.	C. F. Walmerlin	Cole
Talladega, Ala.	Northern Automobile Agency	Cole
Urichsville, O.	C. E. Molesworth	Rambler
Wadsworth, O.	S. H. Hockensmith	Ford
Waterloo, Ia.	A. L. Alexander	Cole
Watertown, N. Y.	C. R. Wise	Cole
Williamsport, Pa.	Central Garage	Cole
Wilkesbarre, Pa.	Wyoming Valley Motor Car Co	Velie
Worcester, Mass.	Malcom Burbank	Pullman
Woodsfield, O.	Troutman Garage	Ford

part of the plans now in the hands of contractors.

Manitowoc, Wis.—Charles Schumacher is selling out his stock of accessories and supplies and will leave the business.

Jackson, Mich.—The Standard Electric Car Co. has increased its sales force by adding A. W. Harrison, formerly of the Woods company.

St. Louis, Mo.—The Missouri Motor Car Co., of St. Louis, has taken on the Alco and Abbott-Detroit lines and will soon move to Locust street.

Madison, Wis.—Charles Seffens, of Stoughton, Wis., has established a branch of his top, glass front and trimming business in the Hokanson garage at Madison.

Beaver Dam, Wis.—The Beaver garage will be opened in the former gas plant building, East Third street, on April 1. It will be under the management of Frank Cox. He will not engage in the agency business.

Watertown, Wis.—Theodore B. Roach has purchased the interest of W. F. Copeland, of Jefferson Junction, in the Copeland-Roach Motor Co., district representative of the Rambler, Reo, Mitchell and Cadillac.

Chippewa Falls, Wis.—The Jenkins Automobile Co. has been organized here to represent the Mitchell and operate a garage at 114 East Central street. Judge F. W. Jenkins is at the head of the new concern. The garage has dimensions of 60 by 100 feet and is fireproof.

Newark, N. J.—Herbert DeWilde has retired from the Wallace DeWilde Co., Cole distributor. The firm name has been changed to the Wallace Motor Car Co. J. H. Bawden, who has been associated with the Colt-Stratton Co., New York, Cole eastern distributor for the past 2 years, joins the Wallace Motor Car Co. as sales manager.

Toledo, O.—The National Motor Sales Co. has secured the agency for Halladay cars in northwestern Ohio.

Denver, Colo.—The Don A. Henry Co. has established an agency for the Ferromatic tire at 130 Sixteenth street.

Milwaukee, Wis.—E. F. Arlington, state agent for the Stutz, has established showrooms in the Mayer garage, 188-192 Eighth street.

Pittsburgh, Pa.—Diamond & Higgins have entered the motor car business as repairmen and are located at South Beatty and Minegot street.

Jackson, Mich.—C. W. Jacoby, formerly sales manager of the Babcock company of Buffalo, has joined the sales force of the Standard Electric Car Co., of Jackson.

Chicago—Charles S. Bougher has succeeded Clinton Ziegler as manager of the Chicago Renault branch at 1606 Michigan avenue. Mr. Ziegler has joined the Garford branch's staff.

Boston, Mass.—The Reed Tire and Supply Co. of Boston has been obliged to lease additional floor space in the building it occupies on Boylston street, alterations for this now being in progress.

Boston, Mass.—W. B. Doan has resigned as manager of the Boston branch of the R. C. H. Corporation and the office is now in charge of Mr. Jordan, who has been one of the company's traveling representatives.

Kalispell, Mont.—The Kalispell Auto Co. is building a garage which will be 50 by 100 feet in size. Although there are more than 150 cars owned in Kalispell, the new garage will be the first and only one here. The Kalispell company has signed up for the agency of the Everitt car in Lincoln and Flathead counties.

Wausau, Wis.—Morgan Brothers, owners of the Coliseum building, will open a garage in the big structure on April 1, it is announced.

Toledo, O.—The Rambler Motor Sales Co. has closed a contract whereby it will represent the Cino and the Alco cars in northern Ohio.

Moline, Ill.—J. M. Dale, formerly with the Midland Motor Co., has accepted a position with Deere & Co., having been appointed secretary of the Deere estate.

Detroit, Mich.—Charles LeJuene, formerly representative of the Warner Instrument Co. for Michigan, has gone with the Panwood Mfg. Co., Grand Rapids, Mich.

Milwaukee, Wis.—W. S. Pearne, for some time past general manager of the Briggs & Stratton Co., Milwaukee, has resigned. Mr. Pearne has not yet announced his future plans.

Boston, Mass.—The Alpena car is now being represented in Boston, with salesrooms on Columbus avenue. The company handling the car has C. C. B. Merrill as president and J. Oscar Youngjohn as treasurer.

Tacoma, Wash.—The local branch of J. T. Keena & Co., northwest Packard agents, has found it necessary to provide a larger place for its service station. New quarters have been found at 218-220 St. Helens avenue.

Shreveport, La.—Avery & Spence have taken the agency for north Louisiana for the Everitt and the Cartercar. They have opened a garage and service station on Milam street. In addition to their line of cars they are representing the Goodyear tire interests and the Indian Refining Co.'s products.

Augusta, Me.—Omaha Motor Car Co., capital stock $1,000,000; to manufacture and sell motor cars; president, R. S. Buzzell; treasurer, L. J. Coleman.

New York—Automobile Tire Filling Co., capital stock $100,000; incorporators M. L. Rogers, S. E. Roberson, H. W. Davis.

Buffalo, N. Y.—Excelsior Sales Co., 730 Main street, capital stock $10,000; to sell motor cars, motor cycles and supplies; directors W. F. Hanavan, H. O. Walt, L. Donnelly.

New York—Great Eagle Motor Co., capital stock $130,000; incorporators G. Hagatrom, E. Hagatrom, H. W. Davis.

Philadelphia, Pa.—Bergdoll Motor Co., capital stock $500,000; incorporator L. J. Bergdoll.

Philadelphia, Pa.—Bergdoll Machine Co., capital stock $100,000; incorporator L. J. Bergdoll.

Buffalo, N. Y.—Buffalo Electric Vehicles Co., capital stock $1,000,000; directors W. P. Seipp, W. C. Feuchter, T. B. Wheeler, F. E. Lane, M. Alexander.

Chicago—Zillo Tire Co., capital stock $20,000; to manufacture motor car supplies; incorporators J. O. Barker, F. W. Alexander, F. E. Alexander, Jr.

Hammond, Ind.—Frederick L. Heintz, capital stock $100,000; to manufacture motor car tires and accessories; directors F. L. Heintz, L. M. Heintz, J. G. Vanderveer, L. Connaghan, C. Fischer.

Chicago—Chicago Electric Motor Car Co., capital stock $110,000; to manufacture motor cars and accessories; incorporators D. F. Rosenthal, L. S. Kositchek, J. L. Gossman.

Shelby, O.—Shelby Development Co., capital stock $15,000; motor car engine; incorporators W. S. Reynolds, J. C. Van Horn, C. S. Moore, T. J. Green, W. H. Myers.

Recent Incorporations

New York—O. E. Short & Co., capital stock $25,000; to manufacture and deal in motors, etc.; incorporators O. H. Short, H. W. Short, H. L. Starr.

Canandaigua, N. Y.—W. J. Hawley Automobile Co., capital stock $30,000; incorporators E. T. Case, W. J. Hawley, L. H. Hawley.

Onandaga Hill, N. Y.—Boyle Brothers and Pate Co., capital stock $5,000; deal in and repair motor cars; incorporators W. D. Boyle, J. R. Boyle, A. N. Pate.

New York—Washington Square Taxicab Co., capital stock $5,000; incorporators L. A. Cuneo, W. E. Podesta and Fred Cuneo.

New York—Pierce, Wells and Keedwell Co., capital stock $10,000; to manufacture and deal in motors and motor cars; incorporators P. Krulder, Jr., A. C. Keedwell, A. D. Keedwell.

New York—Standard Auto Renting Co., capital stock $10,000; incorporators D. C. Goodman, W. Machol, E. B. Koenig.

New York—Parker J. Manning Auto Co., capital stock $500; incorporators P. J. Manning, E. E. Manning, I. Levison.

Brooklyn, N. Y.—Alpha Rim Co., capital stock $100,000; to manufacture, motor car rims, tires and supplies; incorporators C. M. O'Donnell, G. H. Tice, M. P. Bau.

Cambridge, Mass.—Grant Motor Truck Co., capital stock $100,000; incorporators Henry F. Grant, F. S. Corlew, G. L. Ellisworth.

New York—Market and Harlem Auto Trucking Co., capital stock $10,000; B. Osterhout, J. L. Robinson, W. Eastman.

Cincinnati, O.—Price Hill Auto and Garage Co., capital stock $1,000; garage business; incorporators John J. Radel, W. J. Wirmel, S. Radel, J. F. Ruehlmann, M. J. Wolfer.

Grand Rapids, Mich.—Commercial Service Truck Co., capital stock $100,000.

Indianapolis, Ind.—Morris Motor Sales Co., capital stock $10,000; directors T. H. Morris, P. H. Krauss, F. C. Krauss, P. H. Krauss, Jr., O. Krauss, D. S. Morris.

Chicago—Economy Garage Co., capital stock $2,500; garage, incorporators J. C. Eastman, L. L. Jones, W. F. Dunn.

Cleveland, O.—Post Tire Armor Co., capital stock $10,000; to manufacture tire protector; incorporators F. S. Castle, L. E. LaFramboise, E. Younger, C. C. Carrell.

Bowling Green, O.—Modern Vulcanizing Co., capital stock $5,000; tire vulcanizing; incorporators E. M. Fries, R. A. Hunter, O. R. D. Hunter, A. M. Fries, J. H. Lincoln.

Charlotte, N. C.—Owens Wagon and Automobile Co., capital stock $50,000; incorporators F. A. Owens, C. S. Alston.

Indianapolis, Ind.—Gilson Motor Starting Co., capital stock $5,000; directors R. K. Allison, Bert Gilson, R. B. Allison.

Philadelphia, Pa.—Shur-Go Starter Co., capital stock $20,000; incorporators J. E. Taylor, T. C. Le Fevre.

Atlanta, Ga.—Cowart Automobile and Accessory Co., capital stock $25,000; incorporators J. M. Cowart, G. S. Pedk.

Chattanooga, Tenn.—Citizens Automobile Co., capital stock $15,000; incorporators C. W. Howard and others.

Cincinnati, O.—Cincinnati Motors Co., to manufacture motor cars and trucks; incorporators Franklin Alter, H. T. Alter, J. B. Doan.